Alexander Pope's *Dunciad* and Ned Ward's *London Spy*: Experiments in Text Visualization
The Dunciad d'Alexander Pope et *The London Spy* de Ned Ward : expériences de visualisation textuelle

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Article abstract

Text visualization is the technique of using graphs and charts to examine text as data. Often, these do not represent a text directly and instead display an output based on word counts, word sequences, and so on. This technique can provide insights into important keywords in a text, provide an overview of textual content, or reveal trends and patterns within one text or across many texts. This paper describes recent development of and experiments with several tools for the Grub Street Project to generate visualizations of eighteenth-century texts, especially in terms of the spatial relationships of words and entities on the pages of the original documents. Two examples are discussed in this article as test cases: Edward Ward's *The London Spy Compleat, in Eighteen Parts* (1703) and Alexander Pope's *The Dunciad. With Notes Variorum* (1729).

Alexander Pope's *Dunciad* and Ned Ward's *London Spy*: Experiments in Text Visualization

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The *Grub Street Project* website is a spatially oriented, digital edition of London, with a broad aim to provide online open-access texts, images, and tools for the study of London through the long eighteenth century. I have previously discussed using maps in the project to visualize the networks of literature and the culture of bookselling in the city.[1] The project also draws on a long tradition of digital humanities research and experimentation using computational methods to gain insights into texts of this period. This paper focuses on recent developments in this project, specifically in the context of the development of tools that aid in visualizing the texts of works printed and sold in London during the long eighteenth century as spatial relationships of words on the page. In this article, I introduce some tools developed for visualizing editions in the Grub Street Project, focusing on Edward Ward's *The London Spy Compleat, in Eighteen Parts* (1703)[2] and Alexander Pope's

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1. For the parameters of this project see "The Grub Street Project: Imagining Futures in Scholarly Editing," in *Online Humanities Scholarship: The Shape of Things to Come. Proceedings of the Mellon Foundation Online Humanities Conference at the University of Virginia March 26–28, 2010*, ed. Jerome McGann, with Andrew Stauffer, Dana Wheeles, and Michael Pickard (Houston, TX: Rice University Press, 2010), 25–58; and Allison Muri, Benjamin Neudorf, and Catherine Nygren, "The Grub Street Project: A Digital Social Edition of London in the Long 18th Century," *Digital Scholarship in the Humanities* 31, no. 4 (March 2016): 829–49.

2. *The London-Spy Compleat, in Eighteen Parts*, eds. Allison Muri and Benjamin Neudorf (Saskatoon: The Grub Street Project, in progress).

The Dunciad. With Notes Variorum (1729).[3] I also share some experiments in visualizing the spatial topographies of these texts and some preliminary insights gained from these experiments.

These two texts, published roughly twenty-five years apart—one the work of a vulgar and graphic "grubstreet" hack cum tavern keeper, and the other the work of a witty and learned man of letters who would fashion himself into the foremost poet of his age—might seem an unusual pairing. In the first instance, *The Dunciad* was an important text to begin with because it is one of the most complicated arrangements of text on the page in this period. Having successfully created a facsimile of those pages in the Grub Street Project e-book layout and determined the markup to display sections of works in the visualization tools, we have solved problems that would impede development of future editions. It was also important to choose a text with which we could compare *The Dunciad* since a vital aspect of this project is experimenting with visualizing representations of the same entity (person, place, organization, creative work) across many different works. Pope numbered Ward among the frogs in his *Peri Bathous: or, Martinus Scriblerus His Treatise of the Art of Sinking in Poetry,* those "such as can neither *walk nor fly,* but can *leap* and *bound* to admiration," which "live generally in the *bottom of a ditch*, and make a *great noise* whenever they thrust their *heads above water.*"[4] Later Pope cites *The London Spy* as an example of "The Pert *Style*," which becomes "the low in wit." In *The Dunciad* itself, Pope smears Ward with the suggestion that his low writings have great appeal to those from "ape and monkey lands" (the colonies).[5] Scriblerus' explanatory note in *The Dunciad Variorum*, citing Jacob's *Lives of the Poets*, apparently insulted Ward: "He has of late years kept a publick house in the City (but in a genteel way) and with his wit, humour, and good liquor (Ale) afforded his guests a pleasurable entertainment, especially those of the high-

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3. Alexander Pope, *The Dunciad. With Notes Variorum, and the Prolegomena of Scriblerus*, ed. Allison Muri and Catherine Nygren (Saskatoon: The Grub Street Project, in progress). Hereafter, *The Dunciad Variorum*.

4. Pat Rogers, ed., *Alexander Pope: The Major Works*, rev. (Oxford and New York: Oxford University Press, 2006), 206.

5. Alexander Pope, *Alexander Pope: The Major Works,* ed. Pat Rogers (Oxford: Oxford University Press, 2006), 206, 227, 451.

church party."[6] "Ale" implied a low-class house. In addition, Ward had made some pointed critiques of the City's corruption, greed, and legalized violence in various works, most notably *The London Spy,* and may well have wished to pointedly dissociate himself from it. He responded in kind in *Durgen, a Satyr, to the Celeberted [sic] Mr. P--------pe, on his Dunciad: by Namby Pamby* and *Apollo's Maggot in his Cups: or, the Whimsical Creation of a Little Satyrical Poet*, both in 1729. In the latter, Ward calls Pope "a little ape"[7] and exclaims,

> that which makes the insincerity of *Pope* the more provoking, is, his reporting things contrary to his own Knowledge and Conscience, for *Pope* has drank Wine at *Ward*'s House, and knows it to be a Tavern; yet, … he could not forbear translating it into an Ale-house; insinuating thereby, that *Ward* is possess'd of no other Qualifications than what are directly sutable [*sic.*] to so humble a Station.[8]

The London Spy was written long before this little war on paper, but as a portrait in prose of London by one of Pope's dunces, it complements Pope's portrait of the city in verse in *The Dunciad Variorum.*

These works, very different in style and tone, share a critical and satiric view of the city where several topics of interest intersect. For example, both place significant focus on the poet John Dryden, who is mentioned twenty-seven times in *The Dunciad Variorum*, including the Appendix and Index, and seventeen times in *The London Spy*, where he is one of just a handful of named and identifiable people in the work (most of whom have just one or two mentions). A number of places are mentioned in both texts as well. Drury Lane appears three times in each of *The Dunciad Variorum* and *The London Spy*, both works emphasizing the place's longstanding association with sex workers. *The Dunciad Variorum* shows a tremendous network of relationships. Pope creates an extensive symbolic topography and community of London society: the work alludes to over 400 people; almost 200 creative works, including plays, articles, books, and periodicals; and over 100 places in London and around the world. Even

6. Alexander Pope, *The Dunciad Variorum*, https://www.grubstreetproject.net/texts/T5549/?image=91.

7. Edward Ward, "The Epistle Dedicatory," *Apollo's Maggot in his Cups: or, the Whimsical Creation of a Little Satyrical Poet* (London: Booksellers of London and Westminster, 1729), n.p.

8. Ibid., 38.

with markup still incomplete for some sections, *The London Spy* mentions over 200 people, most fictional and some real, just under twenty creative works, and over 270 places. My question then was how—or even perhaps whether—a graphical analysis of the texts could reveal insights valuable to a literary analysis of the London described by these two authors of Grub Street. Could one represent and compare these textual networks of entities in a meaningful way?

The project benefits from the invaluable work done by the Text Creation Partnership, established in 1999. This was an experimental partnership among the libraries of Michigan and Oxford universities, ProQuest, and the Council on Library and Information Resources. Phase one of the project, "to produce standardized, digitally-encoded electronic text editions of 25,000 titles from ProQuest's Early English Books Online," was completed in 2009. Since then, the project has expanded to "a consortium of (mostly) university and college libraries that have joined together to create standardized, accurate, and faithful XML/SGML-encoded[9] electronic text editions of early printed books … from millions of static page images in ProQuest's Early English Books Online, Gale Cengage's Eighteenth Century Collections Online, and Readex's Evans Early American Imprints."[10] The Early English Books Online-Text Creation Partnership (EEBO-TCP) has produced about 60,000 texts, with a few more thousand on the way. The Eighteenth Century Collections Online-Text Creation Partnership (ECCO-TCP) has produced just over 3,000.[11] The first set of texts from EEBO-TCP released to the public with no restrictions on use was January 1, 2015, while the first release of the ECCO-TCP corpus was in 2011. From these two sets, works published from 1660 to 1800 form a collection of texts to be published on the Grub Street Project website, where an editorial interface enables the incorporation

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9. XML is the acronym for eXtensible Markup Language, a subset of SGML. SGML is the acronym for Standard Generalized Markup Language, which is a standard for the definition of markup languages for documents. Markup (a set of tags) describes a document's structure and other attributes.

10. "About the Partnership," https://textcreationpartnership.org/about-the-tcp/.

11. "About ECCO-TCP," https://textcreationpartnership.org/tcp-texts/ecco-tcp-eighteenth-century-collections-online/.

of editorial apparatus, annotations, and additional tags to those that have been entered in a first pass of the texts.[12]

I began working on text visualizations of Pope's *The Dunciad Varorum* and Ward's *London Spy* before the TCP texts were available (the latter is not included in the TCP corpus). Accordingly, my initial experiments on the two pieces were conducted using only text, without semantic markup. Voyant,[13] a suite of open-access tools for text and statistical analysis released in 2003 by Geoffrey Rockwell and Stéfan Sinclair, provided some preliminary insights. The default setting of Voyant tools is contained in a single browser window with several frames: "Cirrus," a word cloud, the "Reader," containing the complete text, a "Trends" graph, a corpus "Summary," and "Contexts," a tool showing keywords in context. The word clouds, prevalent at the time Voyant was released, show at a glance the dominant words in each text.

The limitations of word clouds are well acknowledged. I show them here to demonstrate their utility compared to other text visualization tools within Voyant and developed afterward. For example, with the exception of stop words such as "a," "to," "it," and so on, "great" is the most frequently used word in *The London Spy* (327 occurrences) and second most frequently used in *The Dunciad Variorum* (121 occurrences). "Friend" is the second most used in *The London Spy* (282 occurrences), while "author" is the most used in *The Dunciad Varorium* (147 occurrences). What is not apparent in these word clouds is context (which is, however, provided through the "Reader" and "Keywords in Context" tools, both visible in the default window). Until the final section, Ward tends to use "great" to indicate a significant intensity, amount, or size. In contrast, Pope uses the word more often to describe gods or goddesses, men of extraordinary ability or eminence, or works of extraordinary quality.

Another confounding result is from the headings "Imitations" and "Remarks" that appear on almost every page of *The Dunciad Variorum* and assume an undue weight in assessing the dominant concepts within the text. These keywords can be excluded, but because every

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12. One can, for example, tag all instances of "Vauxhall Gardens" with confidence by executing a multi-file search and replace process. One cannot do the same, however, with "Black Bull Alley," of which there are several.

13. https://voyant-tools.org/. All images for this article are author-created, with no special permissions required.
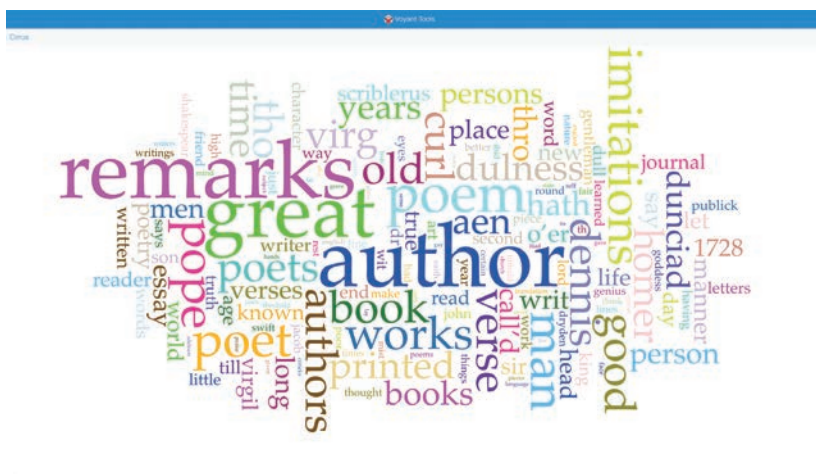
Figure 1. *The Dunciad Variorum* (full text excluding back matter) visualized in Voyant Tools as a word cloud

Figure 2. *The London Spy* (full text) visualized in Voyant Tools as a word cloud

use of either term is equivalent, the few times those terms appear in the body of the text, they would be excluded along with the section headings. In terms of understanding the relative frequency of word appearance, Figure 2 shows how difficult it is to make meaningful observations about word frequency: though the words used most often are all displayed in a relatively larger font than those used less frequently, one cannot discern the count for any of the words without mousing over them. The contexts in which the words are used, and

their spatial relation on the page to the others, if any, are not evident without looking at other charts. Word clouds are organized and displayed according to an aesthetic rather than contextual principle.

Figures 3 and 4 are "Links" graphs that show the links between high-frequency words ("author," "remarks," and "great," in the *The Dunciad Variorum* and "great," "friend," and "man" in *The London Spy*, coloured blue) and the words that appear in proximity to them (coloured orange).

Figure 3. *The Dunciad Variorum* (full text excluding back matter) visualized in Voyant Tools as a Collocates graph

Figure 4. *The London Spy* (full text) visualized in Voyant Tools as a Collocates graph

Figures 5 and 6 are Trends graphs showing the frequency of chosen words. In *The Dunciad Variorum*, "author," "poet," and "Pope" often, but not always, refer to the entity Alexander Pope. In *The London Spy*, "friend" almost always refers to the Spy's friend. Thus, while the graphs might suggest a conclusion about Pope's self-interested treatment of authorship versus Ward's focus on friendship in the city of London, word count alone is inconclusive.

Nevertheless, the "Trends" charts are valuable in determining a word's changing frequency of usage throughout a text as a whole. For example, in *The London Spy*, we can observe that the increased frequency of the word "great" coincides with the final chapter on the funeral of Dryden, filled with references to the great Dryden and the greatness all around him. The limitations of these graphs for a complex text such as *The Dunciad Variorum*, however, become evident in trying to visualize a text with multiple parts shown on each page in the original book. In the original book, a Testimonies section is followed by three books of the poem, in which the pages have lines of the poem at the top, "Remarks" below the poem, and "Imitations" below that (Figure 7). Should one treat each original page as sacrosanct so that a single long document keeps these parts together spatially within the text? Or should the poem in its entirety appear first in the document, followed by all the Remarks, then all the Imitations? The latter was the approach taken (shown in Figure 5), with the result that the appearance of "curl" (Edmund Curll, a major antagonist in the poem) appears to fall dramatically in the final section of the book. However, he is frequently referred to in "Remarks" but not in the "Imitations," which comprise all the text at the end of the file uploaded to Voyant Tools. This situation could obviously be addressed by creating a variety of files—one that contains the full text organized part by part, another that includes the full text organized page by page, another that consists only of the poem, another that is only the Remarks, another that is only the Imitations, three more containing each of the three books, and so on. However, this practice would become unwieldy over time with several texts.

Other experiments aimed at achieving a better sense of context along with word frequency and proximity involved creating a concept graph for each text by generating Graph Exchange XML Format
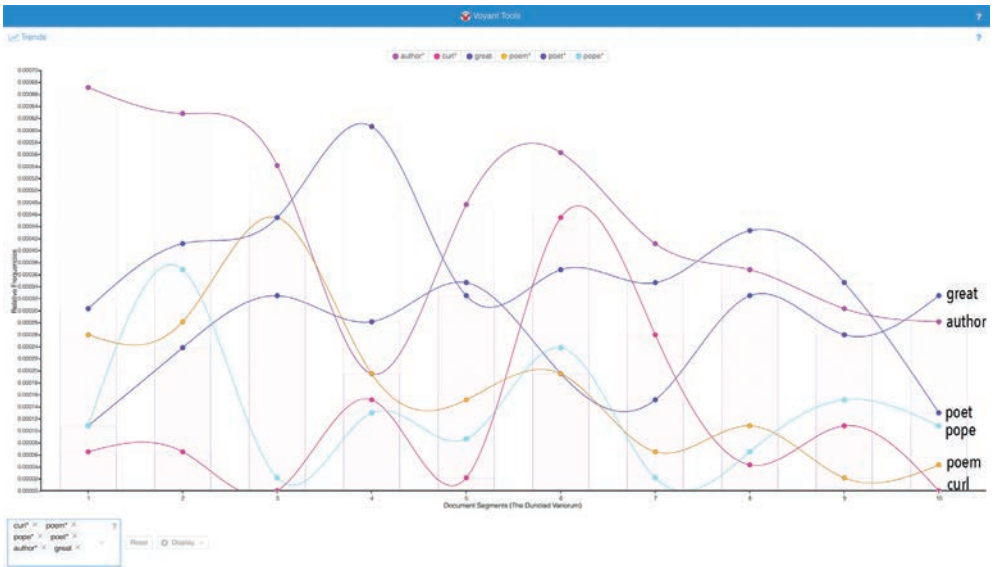
Figure 5. *The Dunciad Variorum* (full text excluding back matter) visualized in Voyant Tools as a Trends graph

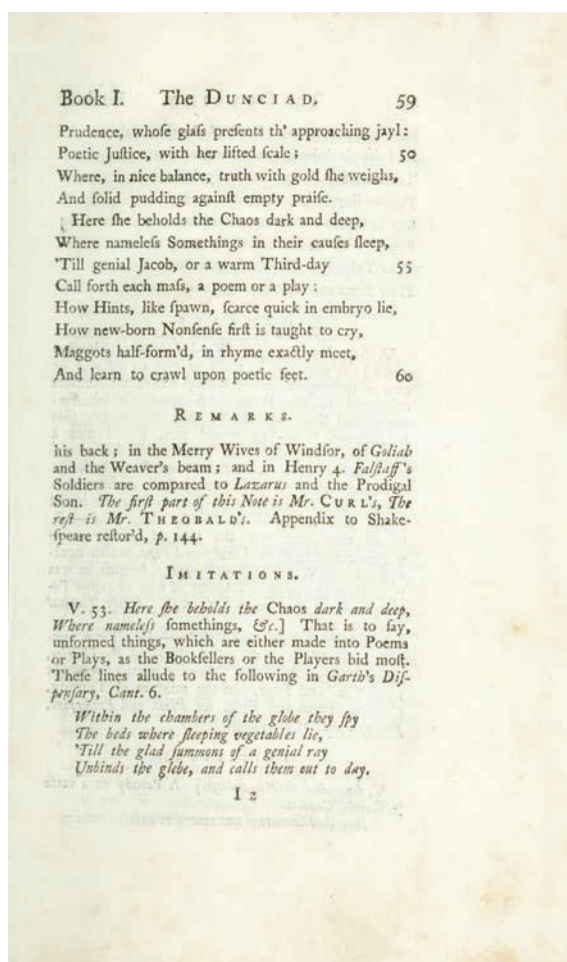**Figure 6.** *The London Spy* (full text) visualized in Voyant Tools as a Trends graph

Figure 7. A page from *The Dunciad Variorum*, showing the poem, Imitations, and Remarks. Courtesy of the Thomas Fisher Rare Book Library, University of Toronto

(.gexf) files with Nodus Labs text mining software Textexture[14] and displaying them with the open graph visualization platform Gephi.[15] The result is a representation of the text as a network where each word is a node, and each occurrence of the word adjacent to another (that is, a co-occurrence) is recorded as a link (the lines connecting the

14. Dmitry Paranyushkin, Nodus Labs, Paris, https://textexture.com/.
15. https://gephi.org/.

nodes). After determining the word pairs, the Nodus software takes a second pass through the text using a five-word grouping. It follows a similar procedure so that for each combination of five words, if a word pair already exists as a result of the previous pass finding two-word groups, the weight of the link between the pair is incremented by one. If a word pair does not exist from the previous pass, it is recorded as a new link with a weight of one. Each connection shown is based on the words' proximity to each other. The sizes of the nodes correspond to their "betweenness centrality," a measure for each word that indicates how often it appears between any two random words in the network. Theoretically, the higher this measure is, the more influential the word is because it functions as a significant junction for communications between the words in the text.[16]

The resulting graphs provided some further insights. Figure 8 shows the graph for *The Dunciad Variorum* (full text excluding the back matter). Unsurprisingly, "author" figures large in this graph again and very clearly as a dominant connecting concept. In this visualization, "person" becomes a more apparent textual connection, while "writing," "character," and "truth" show greater centrality than "dull" or "dulness." Separating the parts of the book also produced revealing graphs.

Figure 9 shows the poem only, where "son," "head," "great," "god," "dulness," and "flame" show more betweenness centrality as described above. "Head" emphasizes the production and reception of creative works (e.g. "Thund'rers head," "stuff this head, / With all such reading," "Priscian's head," "books in ev'ry head"), while the centrality of "sable" alerts readers to possible connections between the excremental "sable blots," "sabler streams," and "sable flood" with "sable flag" and "sable Sorc'rer" (Dr. Faustus).

The graph of *The London Spy* (Figure 10), in contrast, shows that in Ward's text network, "man," "time," "give," and "friend" are central concepts as are, to a lesser degree, "money" and "city" in his critiques of the City of London and the charlatans within all of London, Westminster, and surrounding areas. That "time" and "friend" are

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16. Linton Freeman, "A Set of Measures of Centrality Based on Betweenness," *Sociometry* 40, no. 1 (March, 1977): 35–41; Ulrik Brandes, Markus Eiglsperger, Ivan Herman, Michael Himsolt, and M. Scott Marshall, "GraphML Progress Report: Structural Layer Proposal," *Proceedings of the 9th International Symposium on Graph Drawing* (Springer-Verlag, 2002), 501–12.
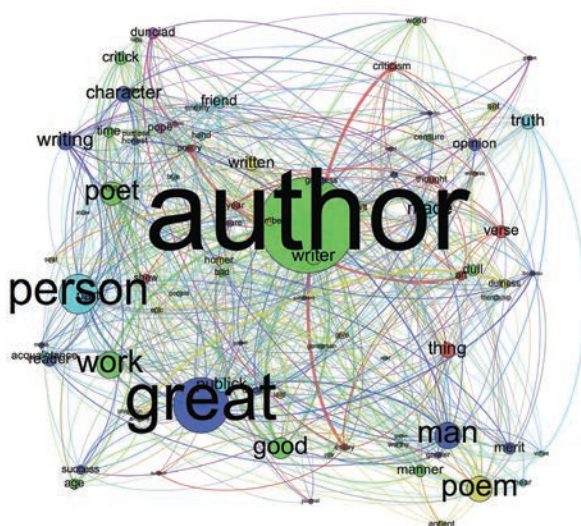
Figure 8. *The Dunciad Variorum* (full text excluding back matter) visualized in Gephi using the .gexf file generated via Nodus Labs Textexture
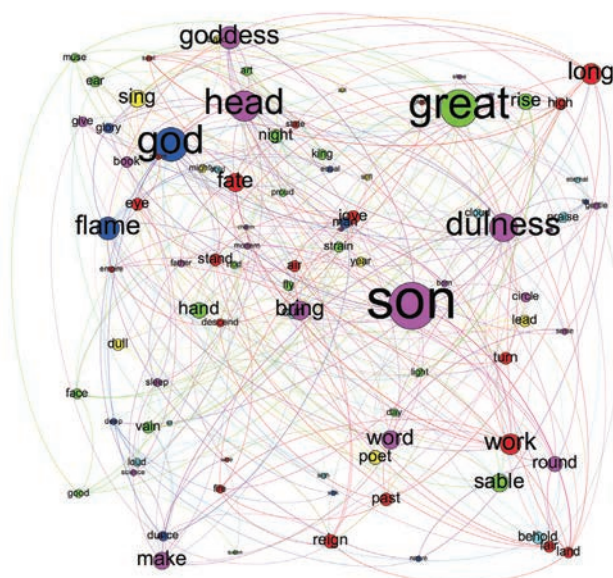

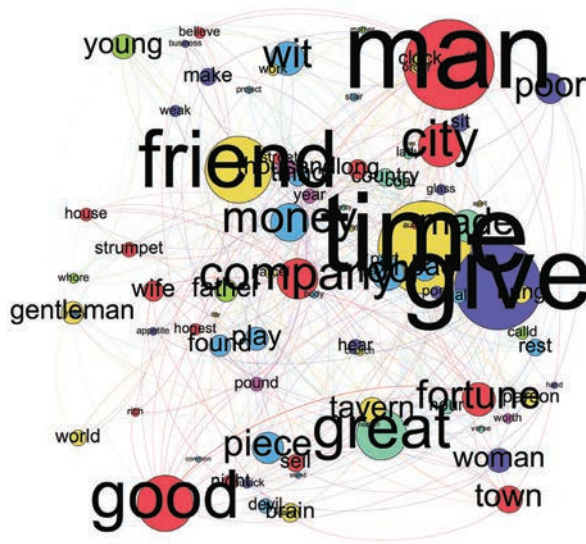**Figure 9.** *The Dunciad Variorum* (poem only) visualized in Gephi using the .gexf file generated via Nodus Labs Textexture

Figure 10. *The London Spy* (full text) visualized in Gephi using the .gexf file
generated via Nodus Labs Textexture

important is not particularly revelatory, given that the narrative is
linear, describing the Spy and his friend travelling throughout the city:
we encounter phrases such as "by this time," "by that time," "a little
time after this," and so on. "Give" is the language of exchange and
most often generosity, whether monetary or social, as in "Lord Bless
you Masters, give us a Penny or a Half-penny amongst us";[17] "I never
give Victuals, but I give Drink, and you're Wellcome Gentlemen";[18]
"I should give him just occasion to Laugh at my Ignorance";[19] and
"he design'd to give the Spectators some Testimonies."[20] Pope's use
of "give" in the *The Dunciad Variorum* indicates that it is far less a
central concept, barely showing in the chart of the full text (Figure
8) and not at all in the chart for the poem alone (Figure 9). Pope's
London is dominated by ideas of great authors, persons, men, and the
anti-heroes and goddesses of the mock epic; Ward's London is a social
and economic environment of men and women, money, company,
fortune, wit, taverns, and play.

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17. Ward, 35.
18. Ibid., 62.
19. Ibid., 188.
20. Ibid., 231.

These examples show how textual visualizations can provide interesting insights and prompt new questions, but these tools also show some limitations. For example, entities called by various names are not captured in word counts: Pope appears in *The Dunciad Variorum* as "the Author," "Pope," "our Author," "our English Poet," "Auth.," "our Poet," "English Author," "Dan Pope," "this Author," "this rising Bard," "Mr. P.," "Mr. Pope," and "Alexander Pope." Many references are missed in a count of references to the author, while "Pope Joan" or "the Pope" will be captured. Moreover, these tools do not reveal the relationships of entities, such as people, places, publications, and so on, to one another. In what follows, I describe the development of several visualization tools we have developed for the Grub Street Project. As mentioned above, the text of the 1729 *The Dunciad Variorum* is a vast network of relationships, an extensive bibliography, and symbolic topography of London society: the work makes reference to over 400 people, and hundreds of printed works and places in London and around the world in the poem and its apparatus. *The London Spy* mentions more than 230 individuals, primarily fictional and some real, just under twenty creative works, and around 270 places. The tools graph the relationships, proximity, and frequency of these entities and words in various ways, both spatial (in conveying their distance from one another on the page) and contextual (in conveying their meaning in context).

Originally, the editions of individual books and pamphlets were conceived as being encoded in TEI-compliant XML. However, at the time that I began creating the website for publication of digital editions, XML proved a problematic proposition for a project that aimed to be accessible to and comprehensible by editors, to reach a wide audience of readers on the web, and to represent a network of linked documents. Although one could readily create documents and links in XML, the language was not supported by most web browsers then, so displaying editions on the web required server-side processing or translation to HTML. Conversely, although HTML was the prevalent document markup language for web pages and supported by innumerable browsers on innumerable computers worldwide, it lacked the semantic richness of TEI-compliant XML. However, the development of the HTML5 specification meant that creating semantically rich digital editions for the web became a significantly more

plausible goal. Therefore, in 2011, I decided to convert the TEI XML to HTML5[21] for the Grub Street editions to utilize schema microdata in the markup as discussed below, with the underlying principle in mind that the editions should contribute to the open-access and open-source environment of the World Wide Web. Additionally, there were many more open-source tools available for building into the project without needing to develop brand new code. Two examples are D3.js, an open-source JavaScript library for manipulating documents based on data,[22] and Google Charts for rendering interactive charts in browsers and mobile devices.

HTML5 introduced new semantic tags and custom data attributes that made it possible to encode texts with semantic data. It is an interoperable standard for web publications and one that will allow linked data and enable the documents to be examined as part of a network of relationships between entities both within the site (the Grub Street edition of London) and beyond (major search engines, linked data browsers, other projects). Introduced with HTML5 was microdata, a set of semantic tags that are recognized by the major search engines Google, Bing, and Yahoo!, which provides a common data vocabulary for structured data. Schema.org[23] microdata provides a shared vocabulary for entities, such as people, organizations, places, books, periodicals, etc. A relational database stores the schema vocabulary, Grub Street Project entity IDs associated with book and periodical IDs from the English Short Title Catalogue[24] and person and organization IDs from the Virtual International Authority File (VIAF);[25] and, more recently, Wikidata[26] (all works in progress).

For example, the schema markup for a reference to Rag Fair (Rosemary Lane, now Royal Mint Street) on page fifty-five of *The*

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21. HTML is the acronym for HyperText Markup Language, the standard markup language for web publications. Like XML, it is a subset of SGML. HTML5 is the 5th major HTML version that is a World Wide Web Consortium (W3C) recommendation.

22. https://d3js.org/. Prototypes of these tools were developed with Hardeep, a Summer Undergraduate Research Intern from IIT-Gandhinagar in India, sponsored by the University of Saskatchewan and the Grub Street Project.

23. https://schema.org/.

24. http://estc.bl.uk/.

25. http://viaf.org/.

26. https://www.wikidata.org/.

Dunciad Variorum appears as follows, automatically generating a dropdown menu in the e-book reader with links to place information and maps on the Grub Street site, and to Google Maps via latitude and longitude data associated with the place ID in the database.

```
pan                  itemscope                   itemtype="http://schema.org/Place"
mid="https://grubstreetproject.net/api/places/3880">Rag-Fair</span>
```

The markup of entities also allows for linking to IDs of (and therefore information about) other entities such as, for example, people, allowing us to distinguish between our Alexander Pope and Pope Alexander VI:

```
<span                itemscope                   itemtype="http://schema.org/Person"
itemid="https://grubstreetproject.net/api/persons/85">Pope, Alexander</span>

<span                itemscope                   itemtype="http://schema.org/Person"
itemid="https://grubstreetproject.net/api/persons/40126">Pope Alexander</span>
```

Similarly, we can identify particular periodicals and books:

```
<span                itemscope                   itemtype="http://schema.org/Periodical"
itemid="https://estc.bl.uk/P1752">Mist&#8217;s Journal</span>

<span                itemscope                   itemtype="http://schema.org/Book"
itemid="https://grubstreetproject.net/api/works/282265">Essay on Criticism</span>
```

Marking the parts of the book as "sections" separates them semantically and thus allows for a better-informed inspection of the spatial relationships of any given entity within sections of the text, as opposed to an arbitrary sequencing of sections in the text. Here, for example, the poem of Book 1 is distinguishable from the Remarks of Book 1:

```
<section data-text="Poem - Book 1" data-header="Book I">
    <span class="l" data-text="l continued" id="25">Here pleas&#8217;d behold her
    mighty wings out-spread,</span>
<span class="l" data-text="l">To hatch a new Saturnian age, of Lead.</span>
    <span class="new-lg" data-text="l new-lg">Where wave the tatter&#8217;d ensigns of

    <span                itemscope                   itemtype="https://schema.org/Place"
    itemid="https://grubstreetproject.net/api/places/3880">Rag-Fair</span>,</span>
<span class="l" data-text="l">A yawning ruin hangs and nods in air;</span>
</section>
```

```
<section data-text="Remarks - Book 1">
<h3 class="sm">Remarks.</h3>
<p data-p="contd">of the greatest Wits, and greatest Generals, of their age.</p>
    <p>V.   24.   <q   class="i">Grieve   not,   my   <strong><span   itemscope
    itemtype="https://schema.org/Person"
    itemid="https://grubstreetproject.net/api/persons/590">Swift</span></strong>!      at
    ought our realm acquires.</q>] [...] </p>
[...]
</section>
```

While the relationships with entities outside the Grub Street Project will be important for future developments, what I discuss in the following is their use for enabling the visualization tools to recognize that "our Poet" and "Mr. Pope" are the same entity, to filter out entity references in *The Dunciad Variorum*'s poem proper versus in the "Remarks" and "Imitations," and to graph the texts as networks of allusions and as spatial textual topographies.

Three of the visualization tools are based on D3.js: Force-directed Graph, Hierarchical Edge Bundling, and Circle Packing. Along with a Text Overview tool and Map View, these three tools employ entities stored in files generated from the microdata. Lastly, contextual information based on the text only is viewable in a Word Tree built on the example code provided by Google Charts and a Word Frequency and Concordance tool (Figure 11).

I will focus mainly on the Force-directed and Hierarchical Edge Bundling tools here. Because the markup identifies each section of the work through the data-text attribute, one can visualize some or
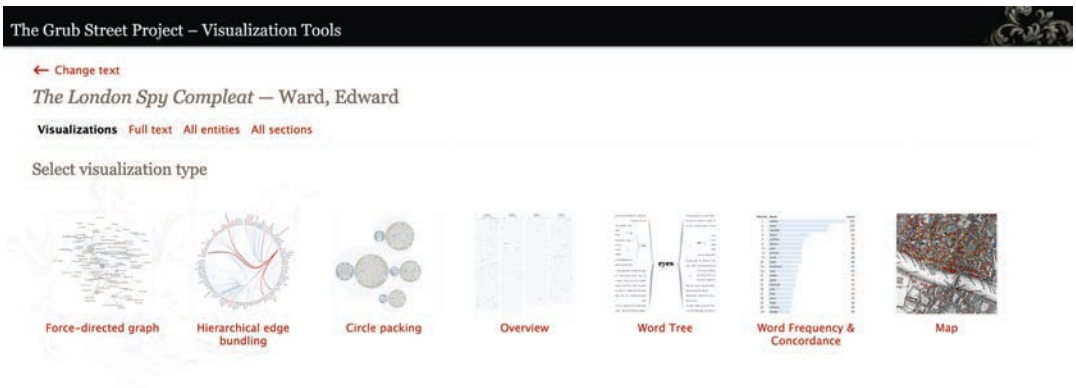

Figure 11. Grub Street Project Visualization tools

all sections. This first example shows how the Force-directed Graph tool may be set to examine the Remarks in Book 1 of *The Dunciad Variorum*, particularly to visualize the co-occurrence (or adjacency) of John Dryden to places and other persons in that section (Figure 12). By default, the graph shows links between entities that occur immediately before and after each other in the selected section(s) (one neighbour on either side). Selecting "4" will link any particular entity with the four or fewer neighbours immediately before and after its appearance in the text.

Accordingly, if "People," "Places," and "Dryden" are chosen for visualization, in the following excerpt, a proximity of "1" would show "Dryden" in proximity to "Ireland" and "Mr. Theobald" (one neighbour on either side). Likewise, a proximity of "4" would show "Dryden" in proximity to "Scribl.," "Dennis," "D——," "Ireland," "Mr. Theobald," "Mr. Dennis," "Furius," and "Furius":

> V. 104. And all the Mighty Mad.] … those *extraordinary hints* and *motions* whereof he himself so feelingly treats in his preface to the Rem. on **Pr. Arth.** [See notes on book 2. verse 258.] **Scribl.**
>
> V. 104. And all the Mighty Mad in **Dennis** rage.] This verse in the surreptitious editions stood thus, And furious **D——** foam, &c. which, in that printed in **Ireland**, was unaccountably fill'd up with the great name of **Dryden**. **Mr. Theobald** in the *Censor*, vol. 2. No. 33. also calls **Mr. Dennis** by the name of **Furius**. The modern **Furius** is to be look'd on as more the object of pity, than of that which he daily provokes, laughter and contempt.

Similar to the Texture examples above, the Grub Street Project Force-directed Graph simulates charged particles and springs: the relationship of entities that are conceptually related due to their close proximity in the text are evident, while spatially unrelated entities (determined as such by their distance from one another in the text) are farther apart in the graph. Nodes represent the entities themselves (person or place), while the weight, or thickness, of the link (or line) between each node indicates how often co-appearances between entities occur throughout the section of the text that is chosen. In short, a thicker link indicates that those entities appear close together more often than those with a thinner link.
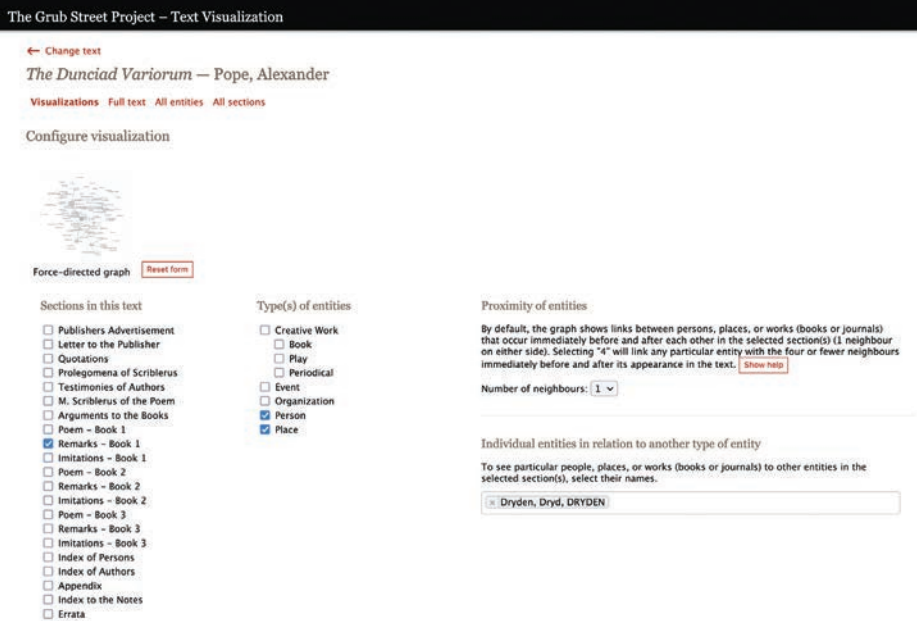
Figure 12. Grub Street Project Force-directed Graph configuration

From the visualization generated by a proximity of "2" in the Remarks of Book I (Figure 13), it is clear that the dominant persons in this section, as determined by the frequency of co-occurrences with Pope's literary idol John Dryden, are dramatist, poet, and critic John Dennis, with whom Pope was feuding (Dennis had viciously attacked Pope as "a hunch-back'd toad"[27] and accused him of being a Jacobite) and poet and dramatist Elkanah Settle (the Poet Laureate replaced by Lewis Theobald as the King of Dunces in the action of the poem). Settle is the "Sage" whose poetic vision will take up most of Book III, concluding with the chilling triumph of dullness: "universal darkness buries all."[28] The dominant persons in terms of frequency of appearance overall in the Remarks section of Book I are Dennis; Theobald (who had abused and exposed Pope's editorial failings in his *Shakespeare Restor'd*); and Settle. The position of

27. John Dennis, *Reflections Critical and Satyrical, upon a Late Rhapsody Call'd, An Essay upon Criticism* (London: Bernard Lintot, 1711), 26.
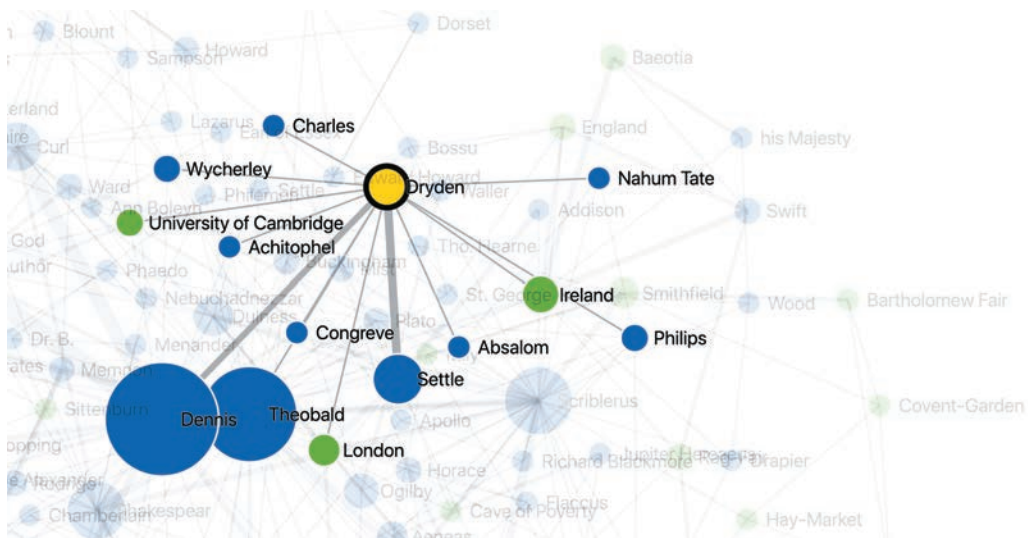28. Pope, 170.

Figure 13. Grub Street Project Force-directed Graph showing Dryden in relation to persons and places (proximity = 2) in the sentences in which the entities appear in the Remarks of *The Dunciad* Book I
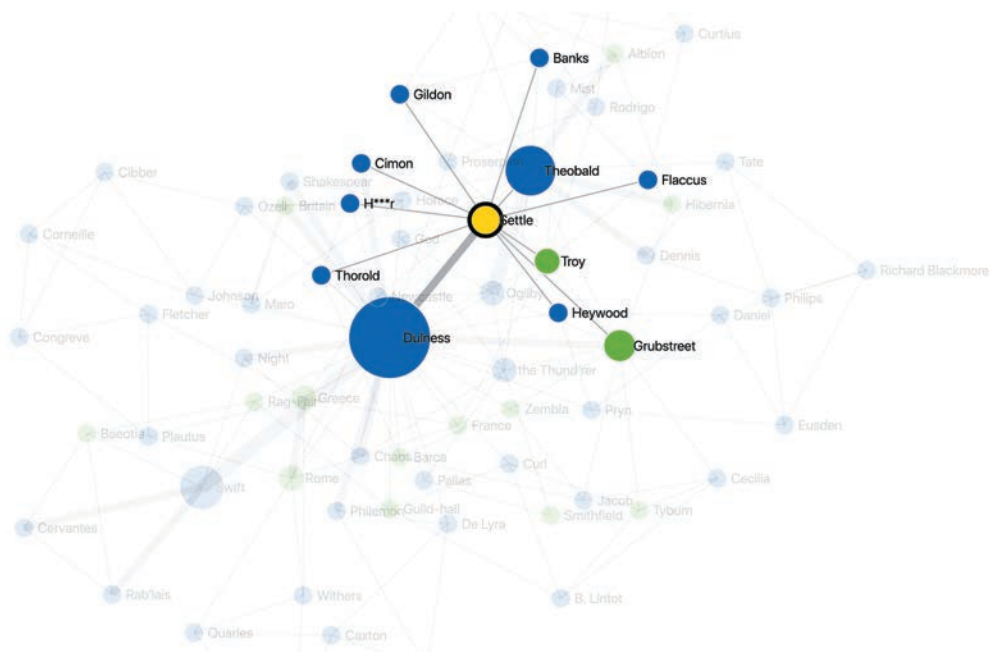

Figure 14. Grub Street Project Force-directed Graph showing Settle in relation to persons and places (proximity = 2) in the sentences in which the entities appear in the Poem of *The Dunciad* Book I

Dryden (appointed England's first Poet Laureate in 1668) amongst these dunces appears as a tiny contrasting presence of once-revered notions of excellence, refinement, mastery, and sublimity in English letters. Notably, Scriblerus (the self-important commentator of the Remarks) and Dulness herself (the central character, the Goddess and Queen of the Dunces who oversees the degradation of the world into dullness and chaos) do not co-occur with Dryden in this proximity setting. The places associated with Dryden—London, Ireland, and the University of Cambridge—carry an import both national and literary. Dryden does not appear at all in the poem section of Book I, but Settle does, co-occurring with the heroic Troy and mock-heroic Grubstreet (Figure 14).

Figures 15, 16, and 17 show the presence of Dryden in the final section of *The London Spy*, wherein the Spy describes the poet's funeral. The graphs of this section (Part 18) reveal a network of both reverential and ridiculous entities. Dryden is surrounded by the unusual, and downright bizarre, circumstances of his funeral as Ward claims to have witnessed it: Dryden had died, the Spy tells us, after the flesh had grown over one of his toenails and, refusing treatment, his whole leg had turned gangrenous. Here we have Lord Jeffreys (second Baron Jeffreys), the "true British worthy" who was reportedly one of those friends and patrons ensuring Dryden would have a public funeral and interment in Westminster Abbey rather than remaining buried at St. Anne's Church, Soho, after a private ceremony; Mr. Russel, a Cheapside undertaker who managed the funeral under Jeffreys' directions; the physician Sir Samuel Garth, who had started the subscription to pay for the costs of a more appropriate funeral and interment in Westminster Abbey and delivered the eulogy at Physicians' Hall where Dryden lay in state after having been disinterred and embalmed. Also, here is Chancery Lane end, where the Spy watched the funeral procession pass by and observed a traffic jam in front of the King's Head Tavern, where coaches of "the Quality" were obstructed by several movable bawdy houses and a parade of pugilists or swordsmen from the now degraded Dorset Garden Theatre in Whitefriars. Finally, here is the prize-fighting gladiator who emerges victorious in the fracas; and the great poets and authors in whose company the great Dryden, in Ward's view, rightfully belonged: Virgil, Pindar, William Shakespeare, Geoffrey Chaucer, and Abraham Cowley. The prize-fighting gladiator,
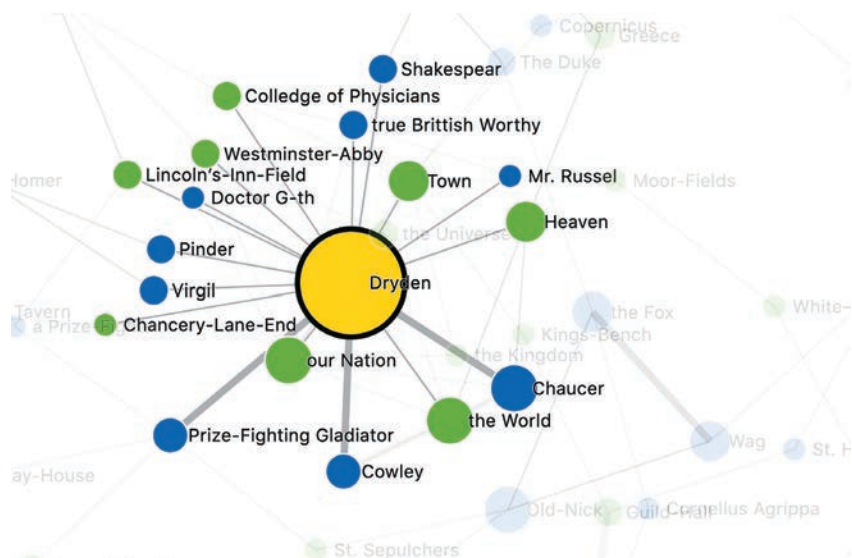
Figure 15. Grub Street Project Force-directed Graph showing Dryden, persons and places (proximity = 1) in Part 18 of *The London Spy*
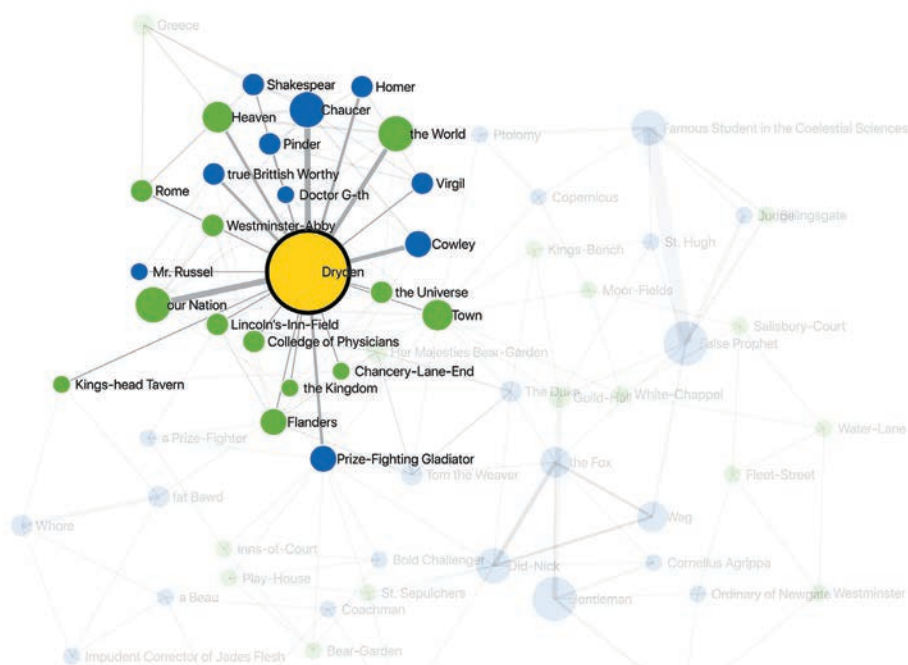

Figure 16. Grub Street Project Force-directed Graph showing Dryden, persons and places (proximity = 2) in Part 18 of *The London Spy*

Figure 17. Grub Street Project Force-directed Graph showing Dryden, persons and places (proximity = 4) in Part 18 of *The London Spy*

Chaucer, and Cowley show the most frequent co-occurrences with Dryden and seem to highlight Ward's irreverent irony. Figures 16 (proximity = 2) and 17 (proximity = 4) show Ward juxtaposing the local and increasingly absurd with the solemnity of the funeral procession and the import of literary greatness. Figures 16 and 17 reveal a high frequency of co-occurrences of Dryden with the World and our Nation, then the Town and College of Physicians, but also captured here are Her Majesties Bear-Garden, the fat Bawd and the Whore in one of the coaches, and Tom the Weaver. Ward's London, like Pope's, mingles high and low, literature and topography. Still, while Pope's London descends into darkness by the end of Book III, Ward's concludes with a legal dispute between two charlatans, one of St. Hugh's False Prophets and a Famous Student in the Coelestial Sciences.

By comparison, Figures 18 and 19 show the same data as above for *The Dunciad Variorum* and *The London Spy* (proximity = 1) in the Hierarchical Edge Bundling graph. These graphs are useful for displaying the same data with less clutter—appearing more clearly here are the relationships of entities among the schema hierarchies (entities → persons → individual person and entities → places → individual place). The lines showing adjacency or co-occurrence are "bundled" to show these relationships more clearly—here, as in the Force-directed Graphs, the thicker the line, the more frequent the co-occurrence.
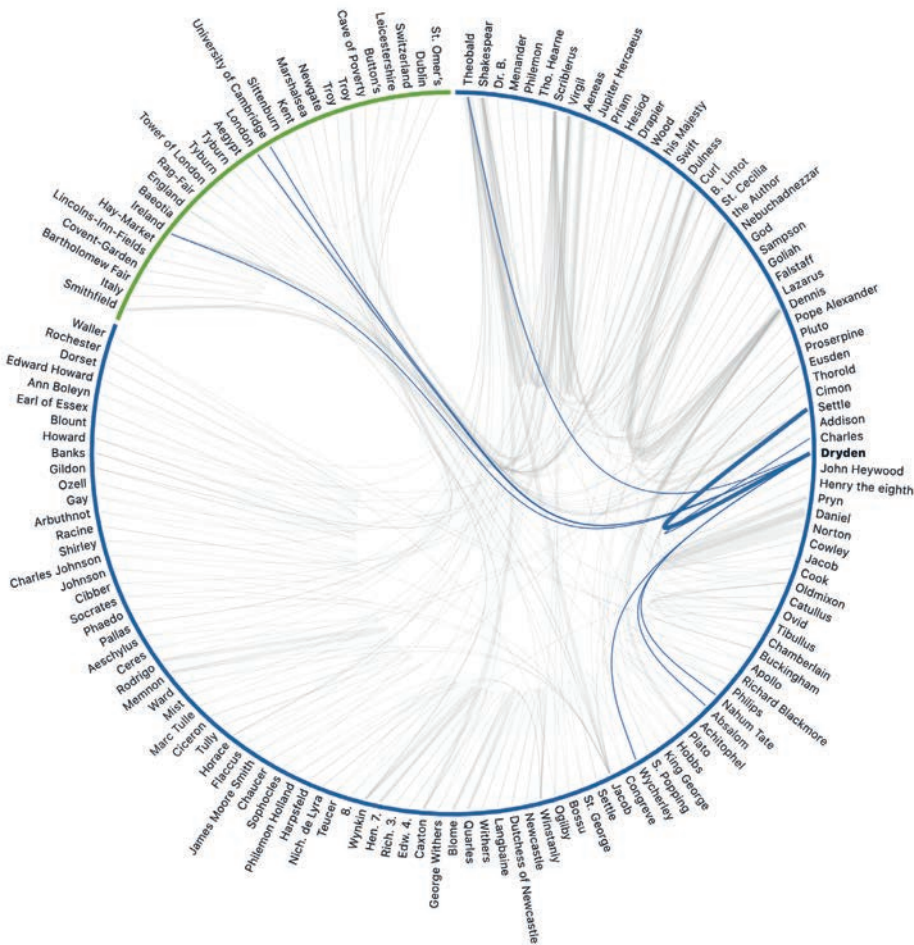

Figure 18. Grub Street Project Hierarchical Edge Bundling Graph showing Dryden, persons and places (proximity = 1) in the "Remarks" of Book 1 of *The Dunciad*

Figure 19. Grub Street Project Hierarchical Edge Bundling Graph showing Dryden, persons and places (proximity = 1) in Part 18 of *The London Spy*

These tools create a new relationship between editor and reader: the editorial choices in terms of markup create a new text, while the reader using the tools becomes a co-author of this new text based upon choices made in generating the graphs. The Grub Street tools provide a unique URL for any query that can be shared and published. This URL provides a mechanism by which other scholars can view the results, experiment with the query, and switch from one tool to another to visualize the same query in a different way. While using these tools implies certain freedom for the end user, it is important to emphasize that the markup choices of the editor impose certain

strictures upon the text visualizations. As an editor, one ponders, for example, if "Mother" can be read as Dulness or Queen Caroline and "son" can be read as Lewis Theobald, or Lord Mayor George Thorold, or King George II, what the best choice might be for the person IDs in the markup. The decision I made, in this case, was to differentiate the fictional characters from the historical persons they might represent. Another option would be to nest the tags so that, for example, the frequency of appearance of George II increases with every mention of "the son." Such a decision could generate interesting views though it would introduce an unwieldy complexity to an already complex text, and the resulting visualizations would undoubtedly exaggerate certain links and contextual relationships.

Another complexity of *The Dunciad Variorum* is that the Remarks and Imitations deliberately and simultaneously undermine, explain, and amplify the poem section. Graphing these separately from one another displays the distinctions between these sections. Figures 20, 21, and 22 show the co-occurrence of Dulness with places and other persons in the Remarks compared to the Poem and Imitations in Book I of *The Dunciad Variorum*. Immediately apparent is the dense network of the Remarks (Figure 21). In the Remarks, the frequency of appearances of Dulness is relatively small as opposed to the living and historical people in Pope's world (Dennis, Theobald, the Author [Pope] himself, Virgil, and Pope's nemesis, the bookseller Edmund Curll). Conversely, viewing Dulness in the Poem of Book I (Figure 20) emphasizes her prominence with significant co-occurrences of Pope's friend and the dedicatee of the poem, Jonathan Swift. The network is much smaller in the Imitations (Figure 22), where, unsurprisingly, Virgil and Milton figure large. Of particular interest is that the only place in London that co-occurs with Dulness in this last is Tyburn ("Hence hymning Tyburn's elegiac lay"[29]), referring to the genesis of Dulness in the "Cave of Poverty and Poetry" in the Tower of London, the state prison where traitors were held before they were executed. The lines imitated are from Virgil's *The Aeneid*, translated by Valerie Rumbold as "whence the Latin race, the Alban fathers, and the high ramparts as Rome," which she glosses as suggesting an ironic parallel between the breeding ground of Dulness and Troy as the source
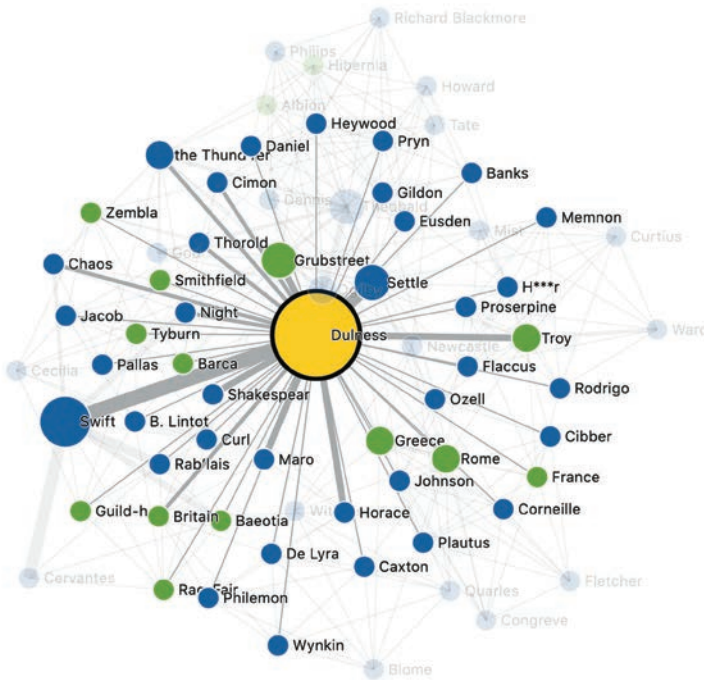
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29. Pope, 57.

Figure 20. Grub Street Project Force-directed Graph showing Dulness, persons and places (proximity = 4) in the Poem of Book I of *The Dunciad*
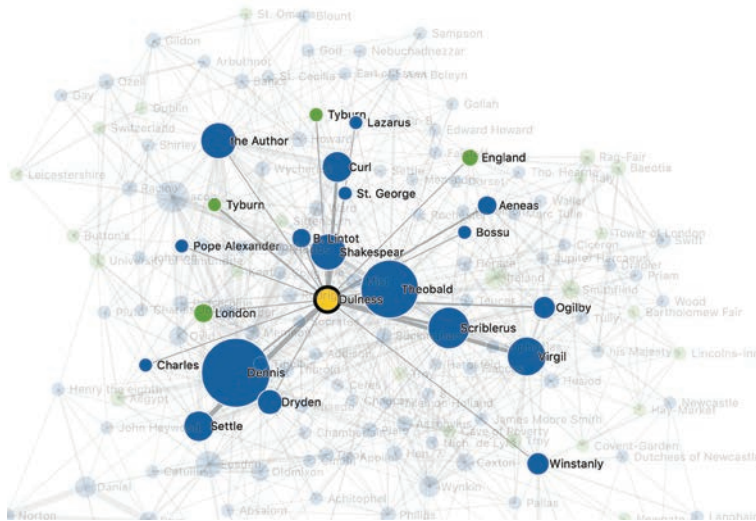

Figure 21. Grub Street Project Force-directed Graph showing Dulness, persons and places (proximity = 4) in the "Remarks" of Book I of *The Dunciad*
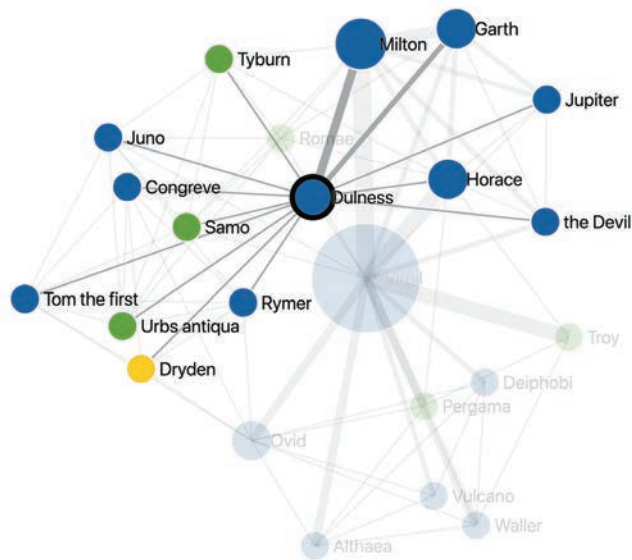
Figure 22. Grub Street Project Force-directed Graph showing Dulness, persons and places (proximity = 4) in the "Imitations" of Book 1 of *The Dunciad*

Figure 23. Grub Street Project Word Tree visualization showing instances of "dulness" in the context of the sentences in which the term appears in *The Dunciad*

of Roman destiny.[30] The unity of the different sections within *The Dunciad* demonstrated in the visualization of these sections is evident to readers who recognize that the person of Queen Dulness is also a representation of the dunces, Pope's enemies who populate the subterranean space of Remarks and Imitations below the poem and who are the antithesis to the heroes and authors of epics. Dulness, and the chaos and anarchy she represents, in other words, permeates these textual networks whether or not she is explicitly named. That understanding comes not from graphs or charts but from close reading and study. The strength of these tools is in the different overviews of a text that the reader/creator of these graphs generates through isolating entities from other words and phrases in the text. Through these tools, the passages as a whole are necessarily taken out of context, but other views are possible. For example, the Word Tree tool can readily display a term in the context of the sentence within which it appears, though the semantic richness is not here retained and Queen "Dulness" is equivalent to ductile "dulness" (Figure 23).

A further complexity of this work that cannot go unmentioned is its evolution over time. *The Dunciad Variorum* was preceded by *The Dunciad: an Heroic Poem. In Three Books.* (1728), which did not have all the textual apparatus of Remarks, Imitations, and extensive front and back matter that populate the poem. It was also followed by *The Dunciad, in Four Books* (1742), in which Pope made numerous changes, including swapping out some of the original dunces for others more contemporary and adding a new fourth book with a darker apocalyptic vision. When the markup of an exemplary text of each of these is completed (a somewhat less daunting task than what we have undertaken so far, now that the initial forays into markup and the database search have been developed), we will be able to graph some of the different relationships Pope established in the three editions. The Broglio manuscripts would no doubt provide valuable visualizations as well.

Of course, scholars of Pope and Ward will know and, for the most part, recognize what these visualizations of these texts show: these graphs do not replace close reading and certainly provide few insights

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30. Valerie Rumbold, ed., *The Dunciad in Four Books* (New York: Longman, 1999), 104.

when those readings are in the realm of the known. The scholarly usefulness of such visualizations and charts might be less in the domain of the conclusions that can be made than in the realm of the questions and insights they inspire. Text visualizations will no doubt prove more useful in the realm of the lesser known: newspapers and periodicals, for example, or less well-studied works. This project of visualization of eighteenth-century texts is still very much at the initial stage of markup and experiment. The most important outcome will result from the interrogation and visualization of many more texts in order to understand both the possibilities and the limitations of this application of text analysis tools as a method toward interpretation.