Figure 1: Word Cloud of "A Scandal in Bohemia"

Teaching Literature Through Technology: Sherlock Holmes and Digital Humanities

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Abstract

How do we incorporate technology into the contemporary classroom? How do we balance the needs of teaching literature with teaching students to use that technology? This article takes up "Digital Tools for the 21st Century: Sherlock Holmes's London," an introductory digital humanities class, as a case study to address these questions. The course uses the Holmes stories as a corpus on which to practice basic digital humanities methodologies and tools, including visualizations, digital archives and editions, mapping (GIS), and distant reading, in order to better understand the texts themselves. This approach lets students find new patterns in well-known texts, explore the function of space in literature, and historicize their own technological moment.

As Digital Humanities materializes in undergraduate classrooms, faculty face the problem of how to teach introductory methods courses: the umbrella term *digital humanities* covers such a wide array of practices—from building digital editions and archives to big data projects—that even defining the term is no easy task.

For anyone trying to create an interdisciplinary digital humanities class, the challenges multiply: the course needs to be applicable to students in such diverse fields as History, English, Anthropology, Music, Graphic Design, or Education, all of which examine different corpora; yet it still needs a unifying concept and corpus so the students can see how applying concepts such as digital mapping or distant reading can spark new insights.

To address these issues, I created "Digital Tools for the 21st Century: Sherlock Holmes's London," which uses Sir Arthur Conan Doyle's Sherlock Holmes stories as a corpus on which to practice basic digital humanities methodologies and tools. The Holmes stories provide the perfect set of texts for a DH class, as they are flexible enough for us to use them in every unit: we use visualization tools (such as Voyant and word trees) to look for patterns in words and in sentence structure within a story, build a digital archive of Holmes artifacts, make TEI-encoded digital editions of Holmes stories, create maps of where characters travel, and topic model all 56 short stories to find thematic patterns. With this structure, students learn some of the most important digital humanities methodologies, analyze the Holmes stories from multiple perspectives, and use the character of Holmes as a model for both humanistic and scientific inquiry.

The stories also facilitate an interdisciplinary approach: they touch on issues of gender, class, race, the arts, politics, empire, and law. This ensures that students from almost any field can find something relevant to their major. Perhaps most helpfully for this class, Holmes solves his cases not just through his quasi-supernatural cognitive abilities, but also through his mastery of Victorian technology, including the photograph, railroad, and daily periodicals. This focus on technology enables students to address the similarities between the industrial and digital revolutions: the anxieties that accompany the rise of blogs and Twitter echo Victorian concerns about the proliferation of print and periodicals, as both audiences were wary about the increased public voice such technologies could invite. These connections help students historicize their own technological moment and better understand both the Victorian period and the discourses around modern technology. The course begins with close-reading and discussion of four Holmes stories to introduce students to the central themes of the class and of Victorian studies, and we use these stories as our core texts with which we practice digital humanities methodologies, so students can see first-hand how visualizations, maps, archives, and distant reading can lead us to new interpretations.

Teaching these methodologies, from digital archives to mapping, requires a tripartite structure that I have dubbed "Read, Play, Build." First, students read articles from books and blog posts about the pros and cons of each methodological approach. They then examine current projects to discuss the ways each approach enhances scholarly fields and poses new research questions. Each unit concludes with an in-class lab component, in which students build small projects on the Holmes stories using a well-known tool and analyze the result. This structure ensures that students receive both theoretical and practical experience with each methodology and can see first-hand its strengths and weaknesses.

This structure is particularly successful in the digital archives unit, in part because the Holmes stories themselves show the benefit of compiling archives: Holmes maintains an archive, or "index," which he consults regularly. Watson explains its significance in the story "A Scandal in Bohemia," which we read in class: "For many years he had adopted a system of docketing all paragraphs concerning men and things, so that it was difficult to name a subject or a person on which he could not at once furnish information" (Conan Doyle [1891] 2006, 5). Holmes's compulsion to categorize and preserve is a central humanist task—we use and compile archives of our own (whether digital or physical) in the course of our research all the time—and in this story, we see Holmes using the archive to solve cases. After seeing the archive in action, used and compiled by one of the great fictional geniuses of Western literature, the students are more ready to build their own archives.

Before building, however, we begin by examining a seminal work of archive theory: Jerome McGann's 1996 essay, "Radiant Textuality." From it, students learn how digital archives preserve works in danger of disintegrating, grant access to works from all over the world to make scholarship more equitable, and enable interdisciplinary and multimodal scholarship by including audio and video in ways that conventional print scholarship cannot. Students then examine McGann's famous digital project mentioned in the article, *The Rossetti Archive*, which includes scans of every known painting, sketch, poem, manuscript, and translation

produced by Pre-Raphaelite artist Dante Gabriel Rossetti, as well as essays on the importance and critical history of each item. Once the students have learned how to evaluate archives from their study of *The Rossetti Archive*, they apply this knowledge themselves by adding to a class archive of Holmes artifacts at holmesiana.net. This archive is powered by the content management system Omeka: a tool that lets people easily create websites without needing web design or development experience. Omeka is particularly useful for this project because, unlike other content management systems, it is specifically designed for curating digital collections of objects that resemble online museum exhibits. For this assignment, students choose three items related to Holmes (e.g. images, video or audio clips, or websites), upload them to the archive, group them into a collection, and then create an "exhibit," or an essay that uses the items as illustrations. These exhibits range from analyses of portrayals of Irene Adler across multiple adaptations to discussions of the soundtrack in the Robert Downey Jr. *Sherlock Holmes* movie. This assignment does more than just teach students how to use a tool: it helps them see the broad appeal of Holmes stories, their role in contemporary popular culture, and, most importantly, the potential for digital tools to change the medium in which we make our scholarly arguments.

We conclude our archive unit by using Book Traces, a tool invented by Andrew Stauffer at the University of Virginia. Book Traces collects examples of nineteenth-century marginalia, or traces of previous readers—including dedications, inscriptions, pressed flowers, newspaper clippings—from nineteenth-century books found in the stacks (not Special Collections) of college and university libraries. When users find these traces, they upload images of the traces (and transcriptions if possible) to booktraces.org, thus contributing to a crowdsourced archive of how nineteenth-century readers interacted with books. We work with Stephan Macaluso, a librarian at SUNY New Paltz, who teaches the students how to recognize Spencerian handwriting (as opposed to Copperplate or the Palmer Method) so students can figure out if the notes in the books were written before or after 1923. Students also learn how to identify notes written in steel-point pen or fountain pen compared with ballpoint to further aid them in dating the traces, before they are let loose in the stacks to find their examples. Even though only 2000 books in our library are from before 1923, my students have had great success finding items for Book Traces. For instance, one student found the book *Shakespeare: The Man and his Stage* with the inscription "To Barry Lupino . . . .a souvenir, Theatre Royal Huddersfield, July 16, 1923 from Alfred Wareing": with some research, she was able to determine that Lupino was a British actor, and Wareing, a theatrical producer with a reputation for producing demanding productions and creating the Theatre Royal. From this, my student concluded that this book had been a gift from the producer to an actor in the production, and that the people involved in the production had used this book to influence their Shakespeare productions. During the course of this project in Fall 2015, my students uploaded the 400th unique volume into Book Traces, and were thanked by Andrew Stauffer himself over Twitter.

This project has multiple benefits. First, it introduces students to the library. Many of my students are in their first semester of college and have never done research, been in the stacks, or looked for a book by call number, and Book Traces turns a library day into a fun and educational scavenger hunt. Book Traces also teaches students about the importance of libraries, even in a digital world: since so many books are digital and since shelf space is expensive, many libraries are forced to sell or destroy books that have free copies online. This project demonstrates why each book is important, and why it is not sufficient to have an online edition only. The assignment also encourages students to rethink their definition of a book: it is not merely the words of a story or poem, but the physical object itself, with all the marks that tell its history and highlight the differences in how nineteenth-century and modern readers used books and understood works of literature. Finally, the project lets students participate in a high-profile digital humanities project: they apply their learning outside the confines of the classroom by crowdsourcing, collaborating with each other and with a librarian, communicating directly with a well-known scholar, and creating new knowledge that will further scholarship on the nineteenth century.

The class also uses simple visualization tools to learn more about Sherlock Holmes stories. For example, as an introduction to visualizations, students read articles about the pros and cons of word clouds. For any readers new to this phenomenon, word clouds are visualizations of word frequency in texts, in which words are larger the more times they appear. Students make word clouds of Holmes stories, write blog posts on their findings, and then discuss the results with their classmates. They have made several interesting

observations, particularly with "A Scandal in Bohemia." "Scandal" is the only work in the Holmes corpus involving Irene Adler, the only woman who outwits Holmes. Adler's ingenuity causes Holmes to reevaluate his opinion of women: as Watson writes at the story's end, Holmes "used to make merry over the cleverness of women, but I have not heard him do it of late" (Conan Doyle [1891] 2006, 15). One might imagine that a story that revolves around a woman and the worth of women would mention words related to women (such as "woman," "women," or "Miss") at least as frequently, if not more so, than words relating to men, especially since the story begins and ends by foregrounding Adler's gender.[1] However, the word cloud actually shows that, although much of the narrative revolves around finding Adler and her photograph, the story contains far more references to men than to women: "men," "man," "Mr.," and "gentleman" occur 45 times, whereas "woman," "women," "lady," and "miss" occur 27 times. This difference suggests that, while the text focuses on one woman's femininity, its sentences themselves focus more on the actions of men.

Students wanted to investigate gender in "A Scandal in Bohemia" at a more sophisticated level than a word cloud allows, so they switched to "word trees," which, as Wattenberg and Viégas (2008) have explained, are "graphical version[s] of the traditional 'keyword-in-context' method [that] enable[…] rapid querying and exploration of bodies of text." Word trees provide a more granular display of sentence construction and patterns by showing how particular words appear in context: users upload a text, search for a word, and are shown a visualization of the words that appear immediately before or immediately after that word in the text. My students uploaded the text of "A Scandal in Bohemia" into Jason Davies's word tree tool to compare how Conan Doyle used the words "Holmes" and "Adler." For example, a search for "Holmes" demonstrates that his name is often followed by verbs of action: Holmes "whistled," "caught," "laughed," "scribbled," "dashed," "rushed," "staggered," etc. Essentially, then, Holmes is characterized by his movements and actions in the story, even though his actions end up being fruitless, as Adler evades him.

word tree `Holmes` ☐ reverse tree ☐ one phrase per line

Shift-click to make that word the root.

Holmes — **had** / **"** / **•** / **,**

"
It is not an English paper at all. Hold it up to the light." I did so, and saw a large "E" with a small "g," a
The name of the maker, no doubt; or his monogram, rather." "Not at all.
"Not a bit, Doctor. Stay where you are. I am lost without my Boswell. And this promises to be interestin
This is my friend and colleague, Dr. Watson, who is occasionally good enough to help me in my cases.
And I." "You will excuse this mask," continued our strange visitor. "The august person who employs m
Your Majesty had not spoken before I was aware that I was addressing Wilhelm Gottsreich Sigismond
Hum! Born in New Jersey in the year 1858. Contralto -- hum! La Scala, hum!
There were several people on the pavement at the time, but the greeting appeared to come from a slim
Married! When?" "Yesterday." "But to whom?" "To an English lawyer named Norton.
You have but to name it." "This photograph!" The King stared at him in amazement.

•
A man entered who could hardly have been less than six feet six inches in height, with the chest and limbs of a H
Then I, rather imprudently, wished you good-night, and started for the Temple to see my husband.

"
said I, "this is too much. You would certainly have been burned, had you lived a few centuries ago.
answered my companion, looking at her with a questioning and rather startled gaze. "Indeed! My mistr

,
who loathed every form of society with his whole Bohemian soul, remained in our lodgings in Baker Street, burie
settling himself down in his armchair and closing his eyes. Our visitor glanced with some apparent surprise at th
shutting his eyes once more. "The facts are briefly these: Some five years ago, during a lengthy visit to Warsaw, I
as we paced to and fro in front of the house, "this marriage rather simplifies matters. The photograph becomes a
staring down the dimly lit street. "Now, I wonder who the deuce that could have been." III I slept at Baker Street
I believe?" said she. "I am Mr. Holmes," answered my companion, looking at her with a questioning and rather st
Esq. To be left till called for." My friend tore it open and we all three read it together.
You really did it very well. You took me in completely. Until after the alarm of fire, I had not a suspicion.
< 25 > Very truly yours, IRENE NORTON, nee ADLER. "What a woman -- oh, what a woman!

had
not yet returned. The landlady informed me that he had left the house shortly after eight o'clock in the mor
sat up upon the couch, and I saw him motion like a man who is in need of air. A maid rushed across and th
she is always the woman. I have seldom heard him mention her under any other name. In his eyes she eclipses and predo
lately. My marriage had drifted us away from each other. My own complete happiness, and the home-centred interests wh
again, and to know how he was employing his extraordinary powers. His rooms were brilliantly lit, and, even as I looked u
whistled. "A pair, by the sound," said he. "Yes," he continued, glancing out of the window.
caught me by the wrist and pushed me back into my chair. "It is both, or none," said he.
drily. "The circumstances are of great delicacy, and every precaution has to be taken to quench what might grow to be an i
slowly reopened his eyes and looked impatiently at his gigantic client. < 8 > "If your Majesty would condescend to state yo
without opening his eyes. For many years he had adopted a system of docketing all paragraphs concerning men and thing
laughed. "It is quite a pretty little problem," said he. < 10 > "But a very serious one to me," returned the King reproachfully
with a yawn. "That is very fortunate, as I have one or two matters of importance to look into just at present.
scribbled a receipt upon a sheet of his note-book and handed it to him. "And Mademoiselle's address?
took a note of it. "One other question," said he. "Was the photograph a cabinet?" "It was.
changed his costume. His expression, his manner, his very soul seemed to vary with every fresh part that he assumed.
's succinct description, but the locality appeared to be less private than I expected. On the contrary, for a small street in a
dashed into the crowd to protect the lady; but just as he reached her he gave a cry and dropped to the ground, with the blo
as he lay upon the couch. I do not know whether he was seized with compunction at that moment for the part he was playi
to draw back now from the part which he had intrusted to me. I hardened my heart, and took the smoke-rocket from und
from within assuring them that it was a false alarm. Slipping through the shouting crowd I made my way to the corner of t
by either shoulder and looking eagerly into his face. "Not yet." "But you have hopes?" "I have hopes.
staggered back, white with chagrin and surprise. "Do you mean that she has left England?" "Never to return.
rushed at the bell-pull, tore back a small sliding shutter, and, plunging in his hand, pulled out a photograph and a letter.
coldly. "I am sorry that I have not been able to bring your Majesty's business to a more successful conclusion.
were beaten by a woman's wit. He used to make merry over the cleverness of women, but I have not heard him do it of late

Figure 2: Word Tree with "Holmes" from "A Scandal in Bohemia"

The word "Holmes" is often preceded by "said," "remarked," "asked," or by the rest of his name and title (e.g. "Mr. Sherlock Holmes"). Syntactically, then, throughout the story, Holmes is associated with his actions and speech, and has a high degree of agency.
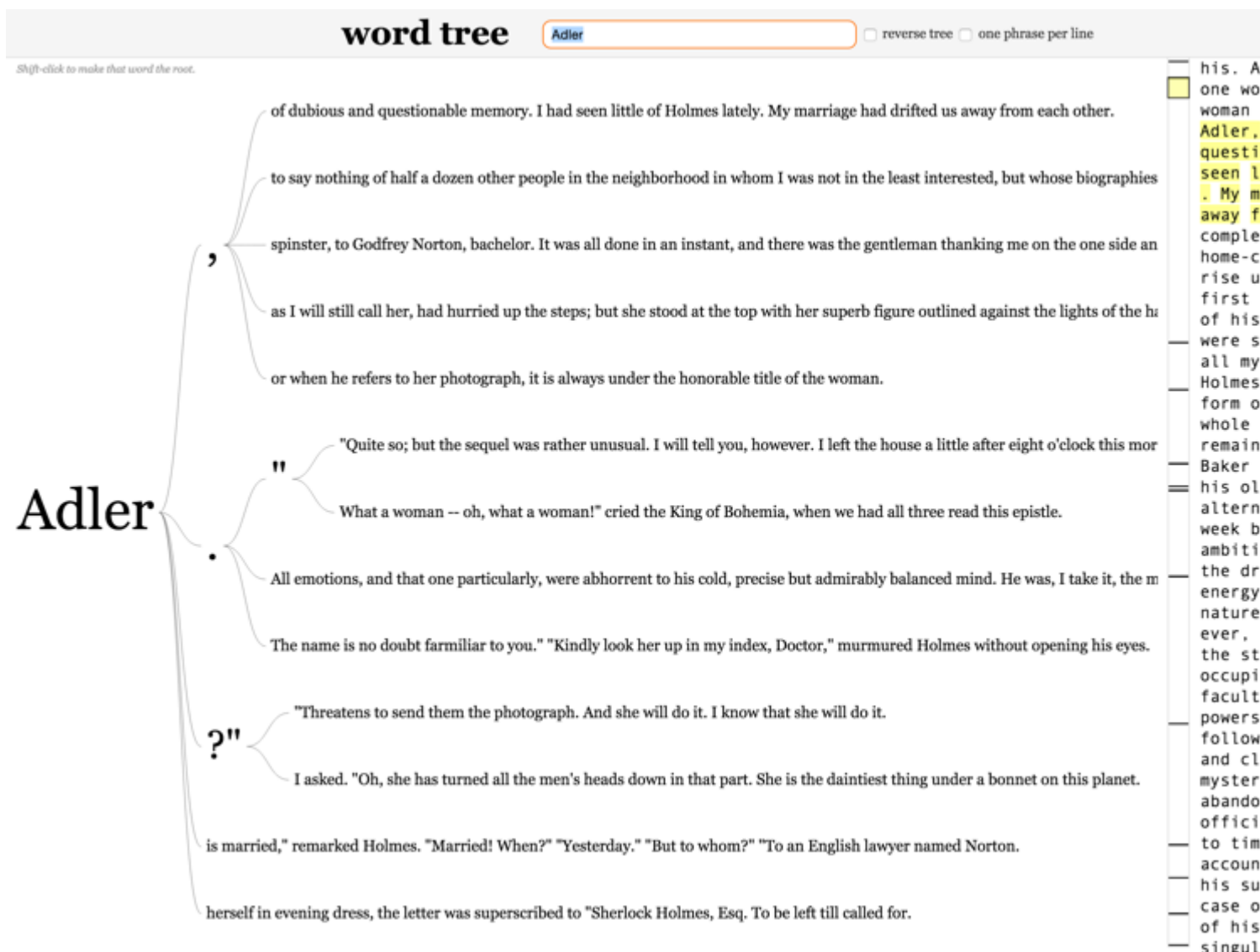
word tree

Holmes

☑ reverse tree ☐ one phrase per line

Shift-click to make that word the root.

...der half a crown a packet. It is peculiarly strong and stiff." < 5 > "Peculiar -- that is the very word
" He looked from one to the other of us, as if uncertain which to address. < 7 > "Pray take a seat
much to say that it is of such weight it may have an influence upon European history." "I promise
...s at once that the title by which I have just called myself is not exactly my own." "I was aware of it
power. I have come incognito from Prague for the purpose of consulting you." "Then, pray consult
...e betrothal was publicly proclaimed. That will be next Monday." "Oh, then we have three days yet
appeared to come from a slim youth in an ulster who had hurried by. "I've heard that voice before
From what I have seen of the lady she seems indeed to be on a very different level to your Majesty
...t upon the palm of his hand. "Your Majesty has something which I should value even more highly
...sage, paused immediately outside the door. Then there was a loud and authoritative tap. "Come in
...d that of a staff-commander who had written a monograph upon the deep-sea fishes. "Let me see

," " said

!

dated at midnight of the preceding night and ran in this way: MY
leave a photograph which he might care to possess; and I remain,
the steps. She watched us with a sardonic eye as we stepped from the brougham. "
...our door, and so made sure that I was really an object of interest to the celebrated
...at scandal threatened to affect the kingdom of Bohemia, and how the best plans of
...orning with her husband by the 5:15 train from Charing Cross for the Continent." "What!
The photograph was of Irene Adler herself in evening dress, the letter was superscribed to
...ny Lodge, waiting for the coming of its occupant. The house was just such as I had pictured it from
...e door. He was searching his pockets for the key when someone passing said: "Good-night, Mister
...orning when the King of Bohemia rushed into the room. "You have really got it!" he cried, grasping
...spoke there was the sharp sound of horses' hoofs and grating wheels against the curb, followed by a sharp pull at the bell
...ure of the man who had been no doubt depicted to him as the most incisive reasoner and most energetic agent in Europe
...m under his cloak and laid it on the table. "There are three hundred pounds in gold and seven hundred in notes," he said
was the centre of a little knot of flushed and struggling men, who struck savagely at each other with their fists and sticks
...cket from under my ulster. After all, I thought, we are not injuring her. We are but preventing her from injuring another
...watched us with a sardonic eye as we stepped from the brougham. "Mr. Sherlock Holmes, I believe?" said she. "I am Mr
every direction, with dismantled shelves and open drawers, as if the lady had hurriedly ransacked them before her flight
the great House of Ormstein, hereditary kings of Bohemia." "I was also aware of that
...dler. The name is no doubt farmiliar to you." "Kindly look her up in my index, Doctor
"You are right," he cried; "I am the King. Why should I attempt to conceal it?" "Why, indeed?

dear Mr. Sherlock

"

.

, " murmured

Twice she has been waylaid. There has been no result." "No sign of it?" "Absolutely none
"And Mademoiselle's address?" he asked. "Is Briony Lodge, Serpentine Avenue, St. John's Wood
...atter of the most extreme importance. If not, I should much prefer to communicate with you alone." I rose to go
...ree o'clock I should like to chat this little matter over with you." II At three o'clock precisely I was at Baker Street
...d in my mind with my wooing, and with the dark incidents of the Study in Scarlet, I was seized with a keen desire to
...roceedings from my post by the window. The lamps had been lit, but the blinds had not been drawn, so that I could
...t one woman to him, and that woman was the late Irene Adler, of dubious and questionable memory. I had seen little
...led through the room and out at the open window. I caught a glimpse of rushing figures, and a moment later the voice
...dressed young men who were lounging up and down with cigars in their mouths. < 18 > "You see
...lify matters." We descended and started off once more for Briony Lodge. "Irene Adler is married
...n rise up around the man who first finds himself master of his own establishment, were sufficient to absorb all my attention, while
...ow that you have been getting yourself very wet lately, and that you have a most clumsy and careless servant girl?" < 3 > "My dear
"E" with a small "g," a "P," and a large "G" with a small "t" woven into the texture of the paper. "What do you make of that?" asked
There's money in this case, Watson, if there is nothing else." < 6 > "I think that I had better go,
...nd general look of peering and benevolent curiosity were such as Mr. John Hare alone could have equalled. It was not merely that
...conspiring, or the grace and kindliness with which she waited upon the injured man. And yet it would be the blackest treachery to

"

.

, but see of

," remarked

Holmes

Figure 3: Word Tree with "Holmes" from "A Scandal in Bohemia"

A search for "Adler," however, shows that her name is only followed by a verb once: the word "is" (in the phrase "is married"). Even though she, like Holmes, takes action repeatedly in the story, those actions are not syntactically associated with her name, and in fact, her action is technically associated with losing her name (as she becomes Norton rather than Adler). "Adler" is most frequently followed immediately by punctuation: a question mark, commas, and periods. Unlike Holmes, then, her name is syntactically associated with pausing and stopping, and thereby with silence and passivity.

Figure 4: Word Tree with "Adler" from "A Scandal in Bohemia"

When we reverse the tree and see what comes before "Adler," we see that every instance is about her name: "Adler" is always preceded by "of Irene," "Irene," "Miss," or "née" (as in "Irene Norton, née Adler). Again, unlike Holmes, whose name was prefaced by words associated with speech (and only sometimes with his full name), Adler is linked to her name only, and not her words, which again decreases her agency and actions.
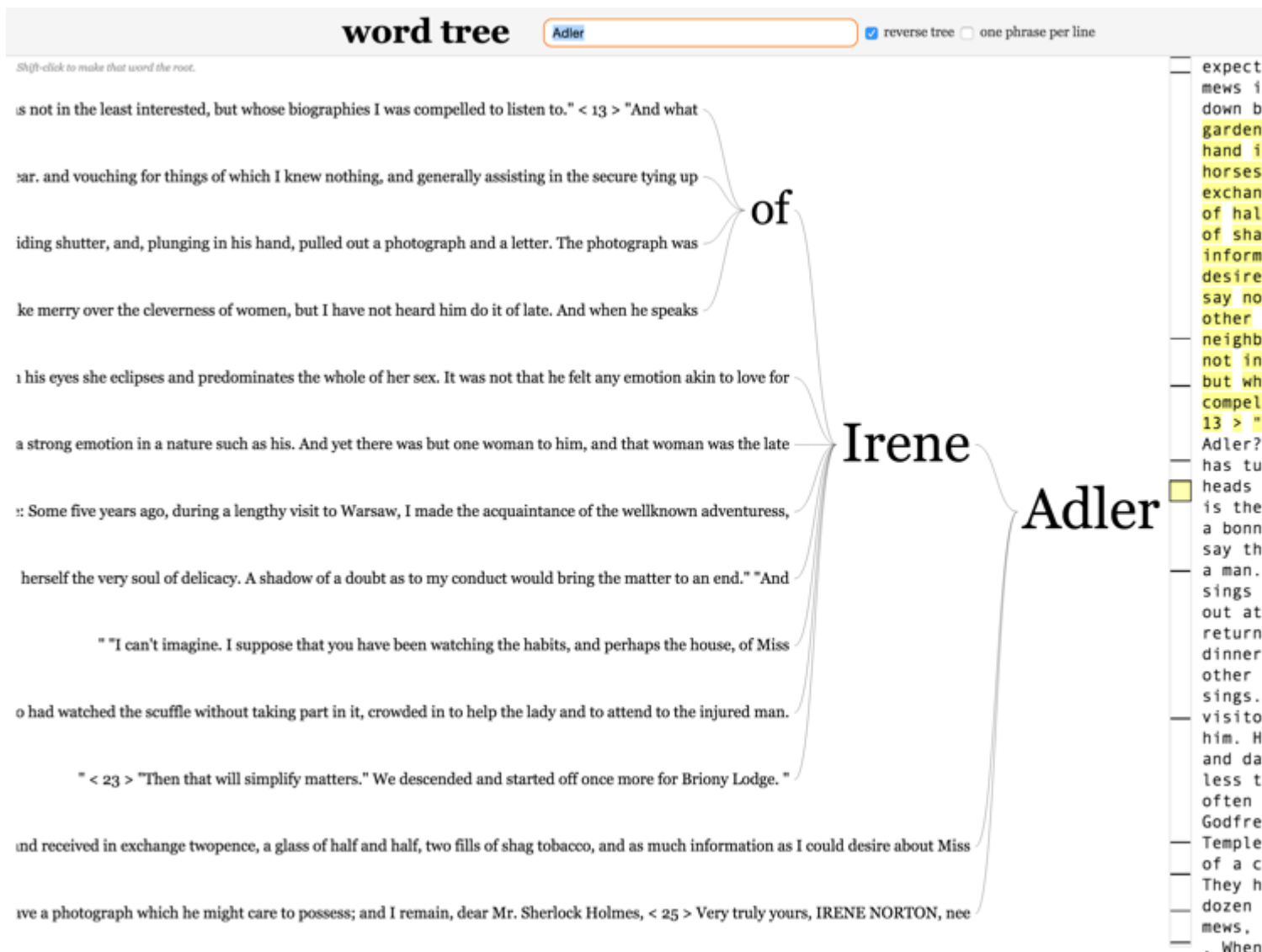
Shift-click to make that word the root.

s not in the least interested, but whose biographies I was compelled to listen to." < 13 > "And what

ar. and vouching for things of which I knew nothing, and generally assisting in the secure tying up

iding shutter, and, plunging in his hand, pulled out a photograph and a letter. The photograph was

ke merry over the cleverness of women, but I have not heard him do it of late. And when he speaks

of

n his eyes she eclipses and predominates the whole of her sex. It was not that he felt any emotion akin to love for

a strong emotion in a nature such as his. And yet there was but one woman to him, and that woman was the late

:: Some five years ago, during a lengthy visit to Warsaw, I made the acquaintance of the wellknown adventuress,

Irene

herself the very soul of delicacy. A shadow of a doubt as to my conduct would bring the matter to an end." "And

" "I can't imagine. I suppose that you have been watching the habits, and perhaps the house, of Miss

o had watched the scuffle without taking part in it, crowded in to help the lady and to attend to the injured man.

" < 23 > "Then that will simplify matters." We descended and started off once more for Briony Lodge. "

nd received in exchange twopence, a glass of half and half, two fills of shag tobacco, and as much information as I could desire about Miss

ave a photograph which he might care to possess; and I remain, dear Mr. Sherlock Holmes, < 25 > Very truly yours, IRENE NORTON, nee

Adler

Figure 5: Word Tree with "Adler" from "A Scandal in Bohemia"

From these visualizations, we can see that, while the story does feature a proto-feminist plot, in which an intelligent, remarkable woman defeats Holmes, its sentence structure does not endorse that standpoint. Instead, the sentence construction renders Adler as a passive figure whose agency is only exercised in marriage. Word trees help us complicate the conventional feminist interpretation of the text.

Visualization technologies can illuminate more than patterns in sentences: they can also provoke new insights about geography in texts. Holmes stories lend themselves to spatial analysis, as they are very invested in locations: Holmes, Watson, and the criminals they track down often travel across London and beyond, and the stories painstakingly describe the paths they traverse. "The Blue Carbuncle," for example, mentions the exact streets Holmes and Watson walk through en route to Covent Garden. However, many students have never been to London, and they know even less about areas of London in the nineteenth century. To address this, students read articles about GIS (Geospatial Information Systems) to understand how digital mapping projects require plotting data on maps and looking for patterns, rather than just digitizing historical maps. Then, they learn how to use a number of nineteenth-century mapping projects: "The Charles Booth Online Archive" is a digitized, searchable version of Booth's poverty maps that let users see the income level of each area of London; "Locating London's Past" lets users map crime data from the Old Bailey archive in addition to data on coroners' records, poor relief, and population data; "London Buildings and Monuments illustrated in the Victorian Web" includes images and descriptions of various London landmarks; and "Mapping Emotions in Victorian London" maps positive and negative emotions associated with streets and landmarks in London from passages in nineteenth-century novels.

Students then choose a location from one of the Holmes stories we discussed in class, research it using previously mentioned websites to compare Conan Doyle's fictionalized account of the area with the historical spot, and then map the locations with either [Mapbox](#) or [Google Maps](#) and look for patterns. They analyze the connections and often come up with interesting results. For example, one student considered the significance of Leadenhall Street in "A Case of Identity." In that story, a wine importer (Mr. Windibank) disguises himself in order to court and then abandon his stepdaughter at the altar so she would be heartbroken and never marry, and he could live off of the interest of her inheritance. The fake fiancé claimed to work in Leadenhall Street and had the stepdaughter address her letters to him to the post office there. One student's research showed that Leadenhall Street was the headquarters of the East India Company until it was disbanded in 1861, and this prompted her to observe parallels between the former East India Company and Mr. Windibank: both were importers of foreign goods, both were very invested in profits, and both acted cruelly to obtain those profits and to control others.[2] Consequently, what initially seemed to be a small, insignificant geographic reference turned into a detail that illuminated a character's moral failings and also a larger political argument.

These small-scale research projects are equally illuminating for fictional locations: students also realized that, in "A Scandal in Bohemia," all streets or locations most associated with Irene Adler are fictional, whereas all other landmarks in the story existed. This discovery prompted a passionate discussion about geography and feminism in the text: students debated whether Conan Doyle was trying to avoid being sued for libel, to claim that an intelligent women like Adler could never really exist, or to dramatize Adler's ability to slip through Holmes's fingers by having her slip through our own (since she can never be mapped). Without these mapping technologies, students wouldn't realize the ways in which questions of geography are inextricably related to class, gender, and other political issues.

The Sherlock Holmes focus is useful beyond its application to visualization and spatial analysis: the character of Holmes himself provides a valuable introduction to the history of technology and close-reading. In "A Case of Identity," for instance, Holmes proves that the stepfather is the criminal and that the stepfather and the missing fiancé are the same person by examining typewritten letters sent by both, in which certain print characters had the same idiosyncrasies due to wear and tear on the keys: as Holmes says, "a typewriter has really quite as much individuality as a man's handwriting. Unless they are quite new, no two of them write exactly alike. Some letters get more worn than others, and some wear only on one side. . . [I]n this note . . . in every case there is some little slurring over of the 'e,' and a slight defect in the tail of the 'r'" (Conan Doyle 1891, 14). This quotation not only shows how technology solves the case, but also how, even within the mechanical, the human (and humanist) shines through. Other Holmes stories likewise unite Victorian technology and writing: in "The Blue Carbuncle," Holmes tracks down the owner of a Christmas goose (and missing bowler hat) by advertising in widely-circulated Victorian newspapers, specifically the "*Globe*, *Star*, *Pall Mall*, *St. James's*, *Evening News Standard*, [and the] *Echo*" (Conan Doyle 1892, 8), papers whose distribution was only made possible by advances in paper and printing technology. Throughout the Holmes canon, then, cases revolve around Victorian technological advances because of how dramatically these innovations changed forms and methods of communication. To modern readers, and especially to students, these inventions hardly seem to count as technology, because "the technological" today is so often synonymous with "the digital." The Holmes stories function as a corrective to that attitude: they encourage students to rethink their definition of "technology" to better understand the Victorian period as well as their own time.

Holmes's facility with technology also furthers our image of Holmes as an expert thinker: his observational skills and "deductive reasoning" are already famous in popular consciousness. He repeatedly insists on the scientific method and the importance of unbiased data gathering, famously saying in "A Scandal in Bohemia," "It is a capital mistake to theorize before one has data. Insensibly one begins to twist facts to suit theories, instead of theories to suit facts" (Conan Doyle [1891] 2006, 3). Consequently, Holmes becomes a useful model for a digital humanist, especially when students may be unused to thinking about data in a humanities context.

In spite of his emphasis on scientific reasoning, Holmes is, at heart, quite the humanist. In addition to his love of the violin, opera, theater, French literature and archiving, Holmes also provides students with a

metaphorical model of a close reader; this can be especially useful when teaching an interdisciplinary class full of students for whom close reading is a confounding, magical process. One particular passage, from "The Blue Carbuncle," helpfully dramatizes Holmes's analytical abilities. When examining a bowler hat, he first makes pronouncements about it, and then breaks down the close-reading process, explaining each step: "This hat is three years old. These flat brims curled at the edge came in then. It is a hat of the very best quality. Look at the band of ribbed silk and the excellent lining. If this man could afford to buy so expensive a hat three years ago, and has had no hat since, then he has assuredly gone down in the world" (Conan Doyle 1892, 4). To Watson (in this metaphor, the non-English major), it seems almost magical that someone could get so much meaning from such a small object (in this metaphor, the paragraph). And yet, by observing the style, the band, and later the hair and the size, and comparing those observations to his mental repository of expected characteristics and actions for people, Holmes figures out who must have owned the hat, much as we observe imagery patterns, sentence construction, and other narrative devices and compare them to our repository of genre or stylistic expectations to come up with a reading of a paragraph (or work as a whole).

Sherlock Holmes, then, brings together the humanities, the sciences, and the technological; the local and the global; and, in the classroom, the past and the present. Although we only read a small subset of the Holmes stories, they provide the perfect corpus for working across disciplinary boundaries, including History, Literature, Gender and Sexuality Studies, Sociology, Law, and Anthropology. As they are short stories, they are the perfect length for courses that contain students from majors beyond English, and their comparative brevity enables us to devote more time to the theoretical and practical import of digital humanities methodologies. Teaching Holmes stories with digital tools lets students build on the traditional humanities skills of close-reading, noting patterns, and using archives. It augments that scholarly toolkit by guiding students to a better understanding of rhetorical patterns and spatial significance, while also introducing them to techniques that have broad applications in their own fields beyond the nineteenth-century focus of this class. The stories' own investment in technology lays the groundwork for the course's own technological focus, and this enables us to thematically tie together the digital humanities methodologies with the Victorian works we study.

Naturally, this project has its challenges: for instance, students from the so-called "digital native" generation are often anything but. While some have specialized computer skills, including video editing or programming, most have only minimal experience, such as word processing or social media. Few have built their own projects, experimented with currently existing digital tools, or thought about how digital technologies can challenge conventional traditions of scholarship. Most students find digital technology intimidating, as they are aware of the limits of their knowledge and are afraid to experiment enough to figure out how programs work—an aspect of trial and error necessary to excel in digital humanities. To overcome these hurdles, I provide my students with detailed instructions, both written and verbal, for every lab day, and I meet outside of class with any students who need additional support. I also model trial and error throughout the semester: if a tool or project produces errors the first time, I explain the reasons I think it might be glitching and then walk them through the troubleshooting process (which often involves Google searches) so they can have the skills and confidence to try to address any stumbling blocks that might arise. I also update the syllabus each time I teach the course: for instance, I cut a unit on topic modeling the Holmes stories and graphing the results when I realized that students needed a comfort level with history and complex visualizations that was greater than I could provide in two weeks. I look forward to making additional alterations to the course as the field of digital humanities changes and new tools and methodologies become available.

The most recent incarnation of "Digital Tools for the 21st Century: Sherlock Holmes's London," from Fall 2015, has a [course website](#) that includes the syllabus, assignments, grading rubric, and student blogs; I hope they inspire others to borrow or build on my ideas. The approach can easily be adapted to a wide range of literary periods and authors, and is especially suited to works that reference real places and historical events, and works that have become part of pop culture. This structure teaches students history, literature, and technology in greater depth and with a greater degree of interaction and intellectual curiosity than often occurs in traditional classroom.

Appendix: Sample Assignments for "Digital Tools in the 21st Century: Sherlock Holmes's London"

Online Assignment #2: Omeka Archive

Instructions:

As a class, we're building an archive of items related to Sherlock Holmes stories (http://holmesiana.net/). Each student will contribute **three related items**, one collection (with your 3 items), and one exhibit (with a 300-word essay on the items) to the archive.

Due:

1. **Due 9/21 by 9:30am:** Accept the Omeka invitation, create an account, and bring three related digital items for inclusion in a Holmes archive.
2. **Due9/25 by 8pm:** Add **three items, 1 collection, and 1 exhibit** that contains a 300-word essay using the objects you added as images. **Post links to the items, collection, and exhibit to the class blog.**

Items:

These items can be anything at all: illustrations from the original Holmes stories, photographs of locations mentioned in the stories or of props in the movies, images of movie or TV show posters of adaptations, pictures of games based on Holmes, audio clips of theme songs of different Holmes adaptations, video clips of the credit sequences of different adaptations, etc. The only requirements are that the items involve Holmes and that you have the permission to put them online.

Copyright:

You **CAN'T**: upload a clip/poster from a TV show/movie/CD that you or a random YouTube user made

You **CAN**: use material from an official account (BBC, MGM) as long as you include a link (the image/clip URL) to the source.

Item Metadata:

For each item, you must write down the Title, Subject, Description, Creator, Publisher, a URL, and Item Type.

Getting Started:

1. Check your email and look for an email from "A Study in Holmesiana Administrator vs hotrods.reclaimhosting.com <swafforj@newpaltz.edu>" with the subject heading is "Activate your account with the A Study in Holmesiana repository." **NOTE: Check your spam folder. It will probably be there.**
2. Open the email and click the link inside. You will be asked to create a password.
3. Type your username (written in the email) and password to log in.

How to Add an Item:

(Modified from http://omeka.org/codex/Managing_Items_2.0)

1. From your items page (net/admin/items) **click** the "Add an Item" button.
2. This takes you to the admin/items/add page where you see a navigation bar across the top pointing you to different stages of adding an item.

3. The first tab shows the Dublin Core metafields. Enter the **Title, Subject, Description, Creator, and Publisher information**.
4. The Item Type Metadata tab lets you choose a specific item type for the object you are adding. Once you choose the type by using the drop-down menu, relevant metadata fields appear for you to complete.
    o If you have an image, select "Still Image" and put the URL of your image in the "External Image URL" field.
    o If you have a video, choose "Moving Image" and paste the embed code for the player in the "Player" field. Don't know how to get the embed code? Follow these instructions.
5. The Files tab lets you upload files to an item.
    o If you have an image, upload your image by clicking "Choose File" and selecting the file.
    o If you have a video from YouTube, you'll need to make an image. Copy and paste the YouTube URL from the top of the webpage into this website, right-click on the image labeled "Normal Quality," save it to the Desktop, and then upload it to Holmesiana.net through the Files menu.
6. The Tags tab allows you add keyword tags to your item.
7. **IMPORTANT: Click the "Public" checkbox under "Add Item."**
8. Click "Add Item" to add your item to Holmesiana.net

How to Build a Collection:

(Modified from http://omeka.org/codex/Managing_Collections)

1. Next, you'll group your items into a collection based on a similar theme.
2. Come up with a name for your collection (e.g. "Irene Adler in Adaptations.")
3. Click on the "Collections" tab in the /admin interface top navigation bar. Any collections you create will be listed on the /admin/collections page.
4. Click "Add a Collection."
5. Name and describe your collection.
6. Click the "Public" checkbox to make this collection visible to the public.
7. Be sure to click "Save Collection" to save your newly created collection.
8. Next, assign items to a collection:
    1. Open an item you want to add to the collection.
    2. To the right of the page, under the "Add Item" button is a drop-down menu where you can assign your item to a collection. Remember, items can only belong to one collection.
9. Be sure to click the "Add Item" button to save your data.

How to Build an Exhibit:

(Modified from http://omeka.org/codex/Plugins/ExhibitBuilder)

1. Click on the Exhibits tab in the top nav bar of the Admin interface, and click the "Add Exhibits" button on the right side. You will arrive at an Exhibit Metadata page. Fill in the empty fields.

    o **Exhibit Title:** This is the title of the entire exhibit (e.g. "Irene Adler in Adaptations").
    o **Exhibit Slug (no spaces or special characters):** This is the exhibit name as it appears in the website URL. "For example, "music" is the slug in http://holmesiana.net/exhibits/show/music
    o **Exhibit Credits:** These will appear with description on the public site. Put your name here.
    o **Exhibit Description:** Write a brief introduction to the entire exhibit that appears on the public site.
    o **Exhibit Tags:** Tags help associate exhibits with other items in your archive.
    o **Exhibit is featured:** Leave this blank.
    o **Exhibit is public/not public:** Check "Public."
    o **Exhibit Theme:** By default, "Current Public Theme" is selected. **DO NOT CHANGE THE THEME.**

o   **Use Summary Page**: Uncheck the box. This will get rid of a title page for your exhibit.

2. To proceed with your exhibit, you must create a page, so **click**"Add Page."
3. Give your page a title and a slug (e.g. "Adler Adaptations" for the title and "adler" for the slug).
4. Next, you choose the layout for your exhibit. Since you'll be writing 300 words about the objects in your archive, you'll want to select "File with Text." This lets you include images and a description about them.
5. Select "Add New Content Block."
6. Now, you're ready to add your text and items.
7. Click the "Add Item" button, select your first item, click "Select Item," give it a short caption (under a sentence), and click "Apply."
8. Type your text about the first item in the box labeled "Text" below.
9. Click on the arrow next to the words "Layout Options." Adjust the drop-down menus to change the position and size of your image.
10. Repeat steps 5-9 for each item in your exhibit. **Remember to click "Save Changes" frequently.**
11. Congrats! You made an exhibit! Click "Save Changes" one last time, then go to http://holmesiana.net, click "Browse Exhibits," and find yours. Click on it and make sure you're happy with how it looks.

Online Assignment #3: Book Traces

Instructions:

1. Search the library catalogue for books published between 1820-1923 from the library stacks (not special collections) based on a certain topic (see list of topics below). Look through these books to find one with marginalia (annotations or marks) or inserts from the **19th century**. Take pictures of **up to five instances** of marginalia or inserts in the book, fill out the information about your book and its marginalia, **including the "description" field**, on http://www.booktraces.org/, upload your photos, and submit your entry.

NOTE: If you have looked through 20 books from the 19th century without finding marginalia, you may stop searching, but you must still write a blog post.

2. Write a 300-word blog post about the traces you found; provide information about the book it occurs in (title, author, publisher, etc.), describe the traces, include pictures of them, and include the link to your book on Book Traces. Explain what the traces have to do with the topic of the book and the pages on which they appear. If a trace includes a name or date, look up the person or date and provide any relevant info you can find (use Google). Here are sample blog posts about Book Traces written by undergraduates at Davidson College: http://sites.davidson.edu/dig350/category/prompts/prompt-3

If you can't find any traces of previous readers, explain what search terms you used to find 19th century books, give some sample titles of books you looked at, and give some guesses about why books with your selected topic do not include any evidence of earlier readers.

The blog post and Book Traces submission are due by **9/30 by 8pm (6% of final grade)**.

USEFUL TIP: Book Traces states that participants have had the most luck finding markings in books from the **PR** or **PS** call numbers (British and American Literature), but it also recommends French and Spanish literature, history, religious texts, and philosophy.

Sample Traces:

Marginal notes, inscriptions, owner's names, any other type of writing, drawing, bookmarks, inserts, clippings pasted into the book, photos, original manuscripts, letters.

Search Terms (grouped by category) in STL catalogue (http://library.newpaltz.edu):

1. Literature, Poetry (or "Poetical Works"), Shakespeare, Impressions
2. Women
3. Antiquities
4. Music (or Songs), Theater (and Theatre),
5. Art, Fashion
6. Travel, Empire, England,
7. Science, Mathematics
8. Law
9. Religion
10. History

Online Assignment #8: Victorian London Locations

Instructions:

In class, you'll be split into three groups that correspond to the four Holmes stories we've read this semester. Choose a location from the Holmes story you've selected, research it using online scholarly sources on Victorian London, and write a blog post about how and why that background information about the location affects our understanding of the story.

Due:

11/8 by 8pm

Details:

1. Choose one spot (not Baker Street) mentioned in the Holmes story you signed up for.
2. Do a search for your street this digital map of Victorian London (http://maps.nls.uk/geo/explore/ – zoom=12&lat=51.5021&lon=-0.1032&layers=163) and then zoom in and take a screenshot.
3. Use a combination of the following sites to learn about the area you have chosen:

- "Historical Eye" (http://historicaleye.com/1896%20London%20then%20and%20now/index.html)
- "Old Bailey Online" (http://www.oldbaileyonline.org/static/London-life19th.jsp)
- "Charles Booth Online Archive" (http://booth.lse.ac.uk)
- "Locating London" (http://www.locatinglondon.org/)
- "British Histories" (http://www.british-history.ac.uk/)
- "London Buildings and Monuments illustrated in the Victorian Web" (http://www.victorianweb.org/victorian/art/architecture/london/index.html)

4. **Write a blog post** about what you've learned about the area and how it relates to the Holmes stories
5. Include 3-4 specific details about the location
   b. Explain the location's importance to the Holmes story, in terms of **plot** and **theme**
   c. Include screenshots and any other pictures you've found that you think will be helpful.

[1] The story begins with the sentence "To Sherlock Holmes she is always the woman" (1) and concludes with a restatement of that opening idea: "And when he speaks of Irene Adler, or when he refers to her photograph, it is always under the honorable title of *the* woman" (15)

[2] Conan Doyle again critiqued the East India Company's unethical imperial project in a later work, *The Mystery of Cloomber*, set during the First Afghan War. In it, a Major-General in the East India Company massacres a group of Afridis on holy ground, and is punished for his crime years later.

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