

1 Mapping the Emotions of London in Fiction, 1700–1900

A Crowdsourcing Experiment

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Introduction

How does literary geography change as it becomes digital? In the new spatial humanities, the turn towards digital methods offers both greater scale and precision, creating opportunities to study new kinds of critical objects. A concept such as Matthew Wilkens's 'geographic investment' (the number of words in a text naming particular places) is made possible by our ability to algorithmically identify and count place-names within a large literary corpus (Wilkens 804). Such a concept is radically new to literary studies and, we argue, important for understanding the complex relationship between fiction and its represented geography, as it allows macroscopic literary-geographic patterns to emerge. However, although the identification of text's geographic investment requires an algorithmic approach, such an approach is unable to parse the meaning of the patterns it identifies. Without knowledge of the ways places were invoked in fiction, maps of general geographic investment are, to a certain degree, intractable to interpretation.

A computer cannot add meaning to place; it can only count place-names. In the foundational works of literary geography, such as Franco Moretti's *Atlas of the European Novel* and Barbara Piatti's project *A Literary Atlas of Europe*, the advantage of the spatial turn lies in the critic's ability to uncover the nuanced relationship between spatial pattern and textual meaning. What is needed, we argue, is a synthesis of these methodological innovations: the ability to uncover geographic information on a significantly new scale whilst at the same time preserving our ability to understand how each place functions within its unique textual environment. Our goal in this project is to put the computational logic of Wilken's geographic investment into contact with the detailed geographical hermeneutics practised by such critics as Moretti and Piatti, so that we can interpret the meanings of places in fiction across thousands of texts.

This chapter is a record of one such attempt at contact, mapping eighteenth- and nineteenth-century novels' affective investments with places in

London.¹ During this period, London's unprecedented expansion fundamentally transformed its social organisation, a transformation deeply imbricated with the contemporaneous rises of the bourgeoisie, literacy, the publishing industry and the novel (Moretti, *The Bourgeoisie*; Barker 52–4; St Clair; Watt). In mapping the ways in which the novel affectively imagined the city at the heart of its own British publication, we hope to construct a geography of London that makes visible these reflexive, literary-sociological 'structures of feeling' (Williams 132; Porter 35). Drawing on the affect-theoretical work of Paul Fisher and Sianne Ngai, we attempt to operationalise the idea that emotions can act 'as a mediation between the aesthetic and the political in a nontrivial way' by mapping fiction's affective engagements with real places in London onto the city's own evolving urban landscape (Ngai 3). In this way, we hope to bring literature into spatial contact with aspects of its own social organisation, superimposing fiction's qualitatively distinct affective representations onto the quantitative dimensions of geographic space and historical sociological data. We believe that digital literary geography can thus provide an important and productive deconstruction of what James English has called 'the false but pervasive perception of a great divide between literature and sociology, with the former all irrational devotion and interpretative finesse and the latter all scientific rigor and verifiable "results"' (xiv). Without conflating them, or subordinating either to the other, such a geography quite literally creates a space in which concepts of literary form and social forces can meaningfully cohabit.

In the following two sections, we present two distinct phases of our project's methodology. In the first, we use predominantly computational methods to measure novels' geographic investment with London through their explicit mentions of known place-names. In the second, we leverage emerging techniques in crowdsourcing to distribute the reading and annotation of passages mentioning London places, in order to gather a readerly consensus on two ways in which each place functions within each passage: (a) whether the passage is set in the place; and (b) whether a particular emotion is associated with the place.

Geographic Investment in Fictional London

Methodology

Mapping a text's geographic investment consists of mapping the known place-names it mentions; however, we recognise that place-names do not exhaust a novel's relationship to place. Novelists of both the eighteenth

1 This chapter and project were made possible by a grant from the Andrew W. Mellon foundation to Stanford's Center for Spatial and Textual Analysis (CESTA). The authors would like to thank Maria Santos for her assistance with statistics and remote sensing techniques; as well as Gabriel Wolfenstein and Zephyr Frank, for their guidance and support. The chapter is part of an ongoing research project in the Stanford Literary Lab, 'Emotions of London'. Here, we give a general presentation of the project's methodology and some of its overall findings.

and nineteenth centuries employed a wide range of obfuscatory techniques when mentioning a setting's location, such as Austen's shortening of English shires to '—shire'. Moreover, settings were often not explicitly related to geographic space at all (Piatti 184). These alternate spatial practices, however, only highlight the specificity and intentionality of an explicit place-naming practice in fiction. Place-names, we believe, do important fictional and cultural work, suturing narrative and geographic space whilst also calling upon and contributing to connotations that have accrued through wider cultural circulation.

The corpus of fiction in which we investigated London place-names derives from the Literary Lab's fictional corpus, which extends through the eighteenth and nineteenth centuries and derives from a variety of sources.² Filtering to include only works of English-language fiction first published between 1700 and 1900, and which were digitised accurately enough for 90 per cent or more of its words to be recognised in a dictionary (representing its OCR accuracy), we were left with exactly 4,862 texts.³ To find passages in this corpus mentioning London places, we developed a hybrid methodology that combines current techniques in computational toponym discovery with a traditional research-based approach. Although Named Entity Recognition (NER) software is a staple of current digital literary-geographic research, most NER packages are trained on contemporary journalistic sources and lack the precision required to recognise many specific locations in historical London (Manning et al.; Finkel and Manning). We therefore decided to supplement the results from an NER analysis of our corpus with historical gazetteer research into a variety of digital, print and map-based resources (Jackson; Paterson; Matthew). From a compiled list of 382 locations, we chose 161 to investigate for this chapter, in an attempt to represent the most frequently mentioned places as well as to retain a spatial representativeness over the wide extent of London.⁴ Our list is certainly not exhaustive, but we believe that, given the multiplicity of its sources and

2 Texts in the eighteenth century are those texts in ECCO marked as fiction by the ESTC, or by researchers in the Lab through its Eighteenth-Century Fictional Marketplace project. Texts in the nineteenth century derive from the Chadwyck-Healey Nineteenth-Century Fiction corpus, as well as from a collection released on the Internet Archive by the University of Illinois.

3 The median OCR accuracy rate is 98.3 per cent. The number of included works by half-century is: 304 novels from 1700–49; 1,079 from 1750–99; 1,290 from 1800–49; 2,189 from 1850–99.

4 A place-name was included due to its frequency if it constituted 0.2 per cent or more of the total occurrences of London places in any half-century of fiction from 1700 to 1900. For example, in all our fiction from 1850–99, London places were mentioned a total of 64,000 times; if a place were to appear 128 times or more in this period, it was included in our list of locations to be searched for in any period. To ensure geographic representativeness, we included at least one place-name for each of the districts and neighbourhoods identified on Booth's 1889 map. This sampling was influenced primarily by the pragmatic needs of mitigating costs in the crowdsourcing experiment in fictional London described below.

sampling methods, it is broadly representative of the most salient locations of the period.

However, due to the ambiguity of place-names – ‘the Tower’, for instance, does not always refer to the Tower of London, nor ‘Richmond’ to the London suburb – it was not enough to simply rely on algorithmic counts of place-name mentions. We decided to generate a random sample of passages in which each place-name occurred. Dividing the two centuries into four half-century ‘periods’, we read through the generated passages per place, annotating whether it (e.g. ‘the Tower’) actually referred to the place in question. We continued this process until we identified at least ten such legitimate passages per place, per period, to be used in the crowdsourcing experiment of section 3. From these annotations, we were also able to estimate how often each place-name legitimately refers to its place in a given half-century of fiction. For instance, we estimate that ‘Richmond’ refers to Richmond the suburb about 60 per cent of the time in fiction published 1850–99.⁵ These likelihoods were then used as ‘scaling factors’, and were multiplied by the number of mentions of a given place-name in all the novels of a given period. For example, ‘Richmond’ occurs about 2,630 times in fiction published 1850–99, so we estimate that it actually refers to the suburb about 1,578 times, or 60 per cent of the total. These scaled frequencies were then normalised, divided by the number of all words in the novels of the respective half-century, in order to express the likelihood, per million words of fiction, of encountering a legitimate mention of each place in each period. These frequencies were then represented using GIS, through which we geographically encoded each place as a polygon extending over its visible boundaries on Charles Booth’s 1889 map of poverty in London. In certain cases, we draw a distinction between ‘buildings’, object-like places including buildings, streets and squares; and ‘districts’, area-like places including neighbourhoods and districts. However, in all but Plate 2, we represent the respective data as circles pinpointed to the centroid of the place’s polygon in order to provide comparability between places as spatially diverse as towers and slums. In Figure 1.1, both the size and shading of a circle symbolise the place’s frequency per million words in fiction of the period. Here, Booth’s map is made transparent, but the boundaries of our ‘districts’ are outlined for geographic reference.

Interpretation: Investment and ‘Stuckness’

In reviewing William Sharp’s 1904 map of the chief localities of Walter Scott’s novels, Piatti notes that these early maps of literary geography ‘succeeded [in visualising] a couple of important aspects’ of the emerging field,

⁵ The remaining 40 per cent of mentions refer primarily to titles (e.g., ‘Duchess of Richmond’), and secondarily to personal names and other locations outside of London.

Geographic investment with London places in fiction

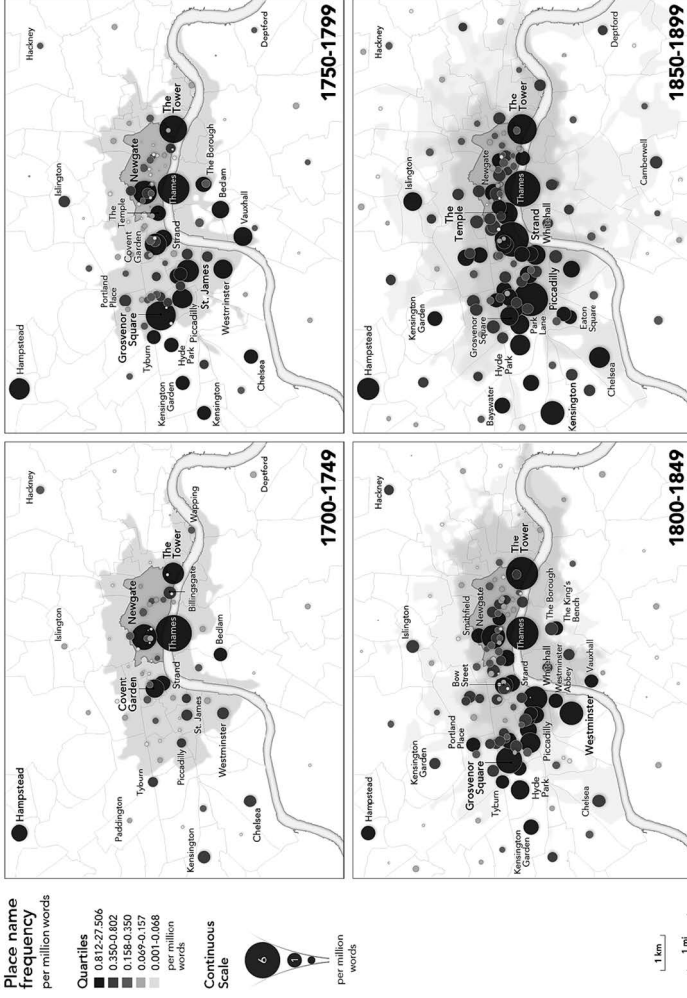


Figure 1.1 Geographic investment with London places in fiction.

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namely ‘the distribution of fictional settings (“gravity centers” vs. “unwritten regions”)’ (181). This tension between novels’ actual geographic investments and their unexplored possibilities seems especially evident in Figure 1.1. These maps pose an important question: were novels really invested in representing London as a whole, or just the City and West End? London grew in population from 600,000 to 6.5 million over the two centuries represented here, expanding far beyond the City’s historic walls and gates (‘Historical Census Population’; Thirsk 6). Fictional London, however, is remarkably concentrated. Broadly representing the most frequently occurring London place-names in our fictional corpus, this map reveals a deep-rooted ‘gravity centre’ in fictional investment centred on the point at which the City and the West End meet. In the process of remediating the city, London fictions distort its geography by compressing and centring it in the West. This concentration of attention is apparent even amongst novels published in the last half of the nineteenth century, at which point London’s urban development had already absorbed most of its outlying communities. Fictional attention, then, offers an alternate map through which we can understand the space of London, a map whose contours are only loosely defined by the contemporary urban geography of London.

But to what extent should we expect this distortion, given London’s historical evolution? The City is, after all, the original extent of London, containing many of its most ancient and iconic locales: St Paul’s Cathedral, the Guildhall, Smithfield and Newgate, just to name a few. And it was only during the plague and fire of London during the seventeenth century that many aristocratic Londoners began to relocate from the City to newly built residences in the West End. Consequently, the West End still contains many of the most fashionable locales in London, as sites such as St. James’ Square organised a new, aristocratic and orderly social space in contradistinction to the piecemeal and mercantile space of the City (Black 118). In a way, then, the concentration of fictional attention reflects London’s actual social geography – but in its seventeenth century configuration, suggesting a kind of literary-historical ‘stuckness’. This stuckness manifests as a discontinuity between the place as it might have functioned in the wider geographic system of eighteenth- and nineteenth-century London, and the place as it would seem to function in the more concentrated geographic system of London’s fictional representation. It is as if this earlier configuration strengthens the capacity of these places to act as cultural symbols for readers of the text, functioning as a shorthand, replete with associations that have accrued through history.

In reality, London in the eighteenth and nineteenth centuries expanded rapidly, dramatically transforming its two oldest districts – the City and the West End – from the city’s residential focal point to the commercial centre around which more populous suburban districts grew. Over the course of the nineteenth century, the residential population of the City fell from 129,000 to 27,000. Although the West End doubled its population from

231,000 to 460,000, this doubling is not proportional to the increase in London's population overall ('Historical Census'). But in spite of their dwindling demographic centrality, the City and the West End remained the centre of literary London across two centuries of fiction. Comparing the history of literary attention to rates of population change, we can see that the boroughs most often mentioned in fiction – Westminster, the City and Camden – are those that least correlate with population changes. For each decade of the nineteenth century, starting from the first census for Great Britain in 1801, we compared the residential population of a borough in London to the percentage of words, from novels published in that decade, which are names for places within that borough. All three boroughs experience a decline in relative population over the course of the nineteenth century, but consistently dominate the relative share of place mentions in fiction. This inverse relationship between relative population and place mentions demonstrates that the tendency in novels to reference a place explicitly is not correlated with population size. Instead, these novels seem to emphasise sites of historical, public and even commercial significance at the expense of a more thorough representation of London's changing residential and domestic geographies.

From these maps, we can observe fiction's geographic investment with London as such; but what is the nature of this investment? How were these places incorporated into fiction? Did they serve as the setting of action, or were they simply mentioned in passing? What kinds of emotions were associated with these places? We have witnessed an historical stuckness in the spatial distribution of fictional attention, but how does the kind of attention given to these places change over time?

Crowdsourcing Emotion in Fictional London

Methodology

Here we discuss the second of our methodological phases: annotating our passages for their emotional association with place, if any. Although relatively underdeveloped in humanities research, crowdsourcing offers the advantage of gathering annotations across a large group of participants. To leverage these emerging techniques, we used the Amazon platform, Mechanical Turk: an online marketplace that allows institutions such as businesses or research groups to publish human intelligence tasks (HITs), which are then completed by anonymous online participants for a small fee paid by the requesting institution ('Amazon Mechanical Turk FAQ').

After numerous pilot experiments using batches of thirty randomly-selected passages – performed to ascertain the responsiveness, abilities and potential biases of the participants – we developed our final, most successful, experimental model. For each place, in each period for which at least ten legitimate passages were found (see section headed 'Methodology'

above), we asked twenty participants to read and annotate each passage. Per passage, participants were asked to annotate whether the boldened place-name at the centre of the 200-word passage was the setting of the passage: in other words, does the passage take place here, or is it simply being mentioned? Half of the participants per passage were asked to annotate whether an emotion of fear was associated with, or experienced in, the location; the other half annotated for happiness.⁶

We decided to begin our study with these two emotions for a number of reasons. Experimental and cost-based constraints restricted to two the number of emotions we could initially study. Consequently, we hoped to capture both a positive and negative valence to emotionality. For Paul Fisher, fear is the most primordial of the negative passions, defining ‘for us the very opposite of all that we will or choose or desire, and for that reason it is the negation of our own self-understanding’ (15). Its long history in political theory, too, as in Hobbes’ theory of society as arising out of ‘mutual fear’, gives to fear’s self-negations a social dimension that is especially interesting for urban geography. Conversely, happiness was newly theorised in the eighteenth century into a pleasurable mental, rather than ethical, state – forming a more modern understanding of the concept that was paradoxically both individualistic and necessarily social (Norton 48). In their polarity, then, between positive and negative sociality, engagement and withdrawal, happiness and fear seemed appropriate as two initial cardinal points of emotion along which to map a range of affective representations of urban experience.

Due to the interpretive nature of our questions, assessing the results provided by the crowd was more complex than simply checking for a predetermined set of ‘correct’ answers. In a separate experiment, we discovered that the consensus of the crowd significantly correlated with the consensus of a group of Stanford English PhD students, suggesting that although consensus rates ranged around an average of 70 per cent, the same passages that were difficult for the crowd were also difficult for the students and vice-versa. In addition, we determined the reliability of individual annotations by closely examining the agreement amongst readers who had tagged the same passages. Using a variation of a weighted Cohen’s Kappa score, we compared the answers provided by each reader on each passage to the

6 In experiments, we discovered that each question-type’s average consensus – measured as the highest percentage of readers in agreement on a given passage annotation with two options – did not significantly improve beyond five readers, whilst the standard deviation did not significantly improve beyond ten. We chose ten readers (per emotion, so twenty readers per passage) to capture this advantage whilst also remaining within our budget. The annotation of each passage would earn a reader \$0.07, a rate we found was sufficient to produce hourly wages that hovered around the U.S. federal minimum wage of \$7.25. Each passage then cost \$1.40 to annotate; and each place cost upwards of \$56 if it were present in all four periods with ten passages.

Likelihood of fictional setting per place

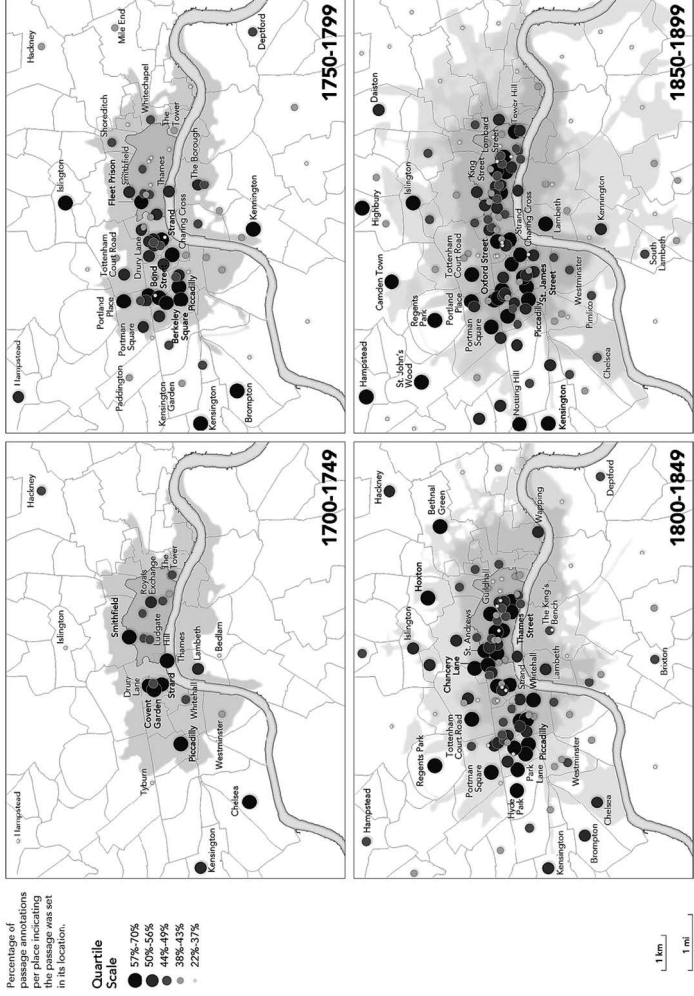


Figure 1.2 Likelihood of fictional setting per place, expressed as the percentage of readers' annotations indicating a place was the setting of its passage.

Source © The Authors.

consensus of all of its other readers, weighting the importance of each passage by the strength of its consensus (Artstein and Massimo; Brants; Reidsma and Carletta). This process allowed us to identify readers who agreed with their peers no more often than chance; these readers' annotations were then manually inspected and possibly excluded from our analysis.

From the resulting data, we created two maps: one for setting (Figure 1.2) and one for emotion (Plate 1). For both Figures 1.2 and Plate 1, we represent all places in the manner of Figure 1.1, as circles pinpointed to their underlying polygons' centroid. To map setting, we quantified the likelihood that, in passages from a particular period mentioning a particular place, the place would act as the setting of the passage, based on the percentage of readers' positive responses to our setting question for those passages. The size and darkness of the circles in Figure 1.2 symbolise this likelihood: larger, darker circles indicate that a passage mentioning that place is more likely to be set there in that period. Similarly, for the emotion data, we quantified the fearfulness and happiness of each place in each period by calculating the percentage of positive answers to both questions on the emotion of the place. Fearfulness and happiness are therefore represented on a single spectrum, with the percentage of fearful responses subtracted from the percentage of happy ones. This spectrum, ranging mostly within -15 per cent to +15 per cent, is represented on the map as a red to green colour gradient. The colour of the circles indicates the emotional valence of the place along this fear-happiness spectrum, with darker reds representing a stronger 'net' likelihood of fear, and darker greens representing a stronger net likelihood of happiness. Conversely, by summing rather than subtracting these percentages, the size of the circles indicates an overall strength of emotionality. Small circles in the middle of the colour spectrum (i.e. grey) represent 'neutral' places rarely found to be emotional; large grey circles indicate emotionally ambivalent places that attracted fear and happiness in equal measure.

Interpretation

The resulting map demonstrates a spatial pattern of emotion drawn from fiction across the eighteenth and nineteenth centuries. Rather than visualising the relative presence of London places in fiction, this map reveals the structures of feeling associated with them. London places are represented as embedded within the intersecting cultural networks of associations, attitudes and social relations through which they operated as places in fiction.

Across the four periods, we see a bifurcation between the happy emotionality of the West End and the fearful tendencies of the City and East End. In truth, the bifurcation is more complex. Not only the West End, but many places then on the periphery of London, such as the suburbanising villages of Barnsbury or Hampstead, are also associated with happiness; whereas some locations in the West, such as the notorious Seven Dials or

Drury Lane, are associated with fear. But these complications only nuance, rather than challenge, the general geographic pattern of emotional polarity. In the previous section, we noted a stuckness in the spatial distribution of fictional attention. Here, the affective bifurcation is only strengthened by a similar kind of historical stuckness, this time playing out within our two centuries. Although particular places may change in emotional association, the overall spatial pattern remains intact across two hundred years of fiction.

Also worth noting is the sheer number of places designated as ‘neutral’: that is, passages in which a majority of readers found neither happiness nor fear. In total, 84 per cent of the passages sent to the crowd were considered neutral. The sheer number of neutral passages is a significant finding of our project. Uncovering the many possible meanings of the absence of affect in these places, whether related to the narratological effects of place invocation, to a dampening of emotional register, or, potentially, a bias within our participants’ non-expert reading, lies outside of the scope of this chapter. Instead, we will focus here on interpreting the geography of emotional presence, in fear and happiness, more broadly.

To investigate the possible causes that led the crowd to reach a majority opinion on whether a passage was fearful or happy, we read through the passages for which a majority was formed, annotating each with one or several possible reasons for the crowd’s decision. The predominant causes of fear in our passages seem to relate to representations of intimidated violence, death, imprisonment, illness and social disgrace. It is as if the novels, in representing fear, turned to the most visceral and powerful representations imaginable. For instance, the most fearful passage in our corpus, by unanimous agreement from the crowd, comes from Mary Braddon’s 1887 novel *Like and Unlike*:

She spends only one day of every week in this house, but she works for us out of doors, going about the streets at night, and talking to wretched women whom few girls of her age would have the courage to approach. That fragile looking girl has penetrated the darkest alleys about Clare Market, the most dangerous streets in Ratcliff Highway, where even the police go at the risk of their lives. (Braddon 210)

Although the ‘fragile looking girl’ is herself likely unafraid, Braddon’s narrator associates Clare Market with the fear of danger and perhaps death. This deep-rooted emotional association with place is exactly what our project sought to uncover and map. Moreover, it seems important to note that the group who does fear Clare Market, unlike the girl, is the police: the group that ideally projects middle- and upper-class juridical power. The location, and therefore the passage, is fearful not to the lower classes, but to the wealthier residents of the city. Fear, here, is both invested in a particular

place and, in turn, through the geography of this investment, organises London into zones of safe travel for implicitly middle- and upper-class characters and readers.

Although no passage by Dickens happened to appear in our random sample of Clare Market passages, Dickens' *Sketches by Boz* includes Clare Market as a place where one might find one of the infamous gin-shops it sketches. However, Dickens mentions Clare Market amongst a handful of other locations only to orient the reader geographically. His sketch is really of 'a' gin-shop, which might be in any one of these locations. This fictional space of the indefinite article seems disproportionately used to represent sites of poverty and modern horror, suggesting a possible imbalance in the type of representation given to fearful and happy places. For instance, we looked at a handful of passages in Dickens' work that we knew to describe slums and urban poverty. Relatively few actually situate the reader in geographic space. Introducing 'Tom-all-Alone's', a fictional slum in *Bleak House*, Dickens writes: 'Jo lives . . . in a ruinous place known to the like of him by the name of Tom-all-Alone's. It is a black, dilapidated street, avoided by all decent people' (256). Like the gin shop, Tom-All-Alone's is 'a' slum, a fictional example that simulates 'the' slums of London. These virtual spaces define a horizon of possibility for our project, which depends upon explicit place names (see section on 'Methodology' above). From their presence within certain texts, however, we can infer that the explicitness of place-names in fiction may vary with the social conditions of the place, for example with whether it is possible for middle and upper-class citizens to travel there.

In contrast to the life-threatening danger of fictional representations of fear in London, happiness seems to relate predominantly to representations of positive sociality. Scenes of friendship, romantic experiences, high society, family and marriage are the most frequent amongst our passages annotated as happy. The only noticeable exception to this trend can be found in idealised natural descriptions – 'the luxuriant banks of the Thames' or the 'the rose-coloured [flowers] which we saw at Kew' – which are typically set in the former villages lying on the periphery of London, such as Hampstead or Richmond. But these moments usually only set the scene for the social. It seems significant that we find relatively few passages in which happiness is represented as a joyful response of an individual to a place; instead, positive responses to places are deeply mediated through the social encounters and relations that they enable. In the following passage from Luisa Keir Grant's 1854 novel *Charles Stanley*, natural description sets the scene for a party:

Her spirits rose as the weather cleared up. Long before they got to Richmond, the sun was shining brightly, and she was talking and laughing with Charles, as if there had been no Sir James in the world. Most of the party had already arrived. Lady Ramsay was hailed by all with pleasure. Some went on the river, others wandered in the park. They met

at dinner, apparently well satisfied with their morning's amusement. (Grant 195)

In this passage, Richmond is not associated with happiness through its agreeable environs, so much as with the social relations which its environs make possible.

Modelling the Literature and Sociology of London

Above, we have noted how London has mediated the emotional polarity of fear and happiness into a geographic polarity of east and west. But what is the logic of this divide? London's east/west polarity is often invoked as a shorthand for class differences; however, is it only class associations that have separated Newgate, Fleet Prison and the Tower of London from Grosvenor Square, Eaton Square and Hyde Park? Their difference in social function, from disciplinary sites to open spaces, seems as relevant as their location in space. It is also notable that Newgate, Fleet Prison and the Tower are amongst the most ancient of London's buildings, originating from the Norman period, whereas development for Grosvenor Square did not begin until 1725 (Sheppard).

Given our data, we considered four sociological factors possibly explaining why certain places have been imbued with a particular emotionality: location in space (the City, or north, east, west or south of it); the class characteristics of its surroundings; the social function of the place (e.g. prison, church, park); and when it was first developed. We also considered a narratological factor possibly influencing the emotion of a place: whether the passage was set there. Ascertaining the contribution of each of these factors to a place's emotionality is a complex problem. Rather than investigate each separately, we elected to measure and compare their combined explanatory effect. Although data on the location, type and age of each place is readily available, measuring its class-constituency was less straightforward. Our solution was to extract data from nineteenth-century sociological research, namely Booth's 1889 London map of poverty and income, using contemporary GIS technology. We had already placed each of our locations onto Booth's map, representing each place as a polygon covering its identifiable boundaries. Using remote sensing techniques (often used with satellite imagery) available in the software ArcGIS, we simplified the map's range of colours, which together represent Booth's seven class distinctions. For example, we compressed the range of reds that signifies Booth's second of seven classes, the 'Middle-class' and 'Well-to-do', into a single hue. These compressed colours were then quantified for each place, as the percentage of the total pixel count that each colour occupies. For districts or other areas of London, we quantified the colours within the area boundaries. For buildings, streets and other types of places, we quantified the colours within a hundred meter walking distance of their perimeter, hoping to capture the micro class neighbourhoods made visible by Booth's map. Overlaying our

colour-coded literary-emotional data onto Booth's map produced Plate 2, a geographic representation of the relationship between class and affect in fictional London.

Even at a glance, relationships between emotion and class are apparent. For Booth, gold indicated the wealthiest blocks of London, and the patterns that they form around our green polygons indicate a relationship between places of fictional happiness and urban concentration of wealth. Cavendish Square, Portland Place, Grosvenor Square, Park Lane and Berkeley Square were all upper-class locations by Booth's time, and were all associated with happiness in fiction by the crowdsourcing participants. In contrast, Seven Dials and King's Bench Prison are often represented as fearful in fiction, and are embedded in areas bordering on blue and black, representing Booth's struggling classes. Unfortunately, the distribution of our locations, combined with the design of Booth's map, makes it difficult to explore more deeply the relationship between fearful and lower-class locations: Booth did not include the City in his map, which houses many of our places associated with fear, on account of its having already transformed from a residential to a commercial space ('Poverty Maps of London'). For this reason, we excluded locations in the City from our class analysis, but retained them when considering non-class factors.

How, then, do all of these apparent correlations – between emotion on the one hand, and on the other hand location, class, era and type of location – compare quantitatively? By using odds ratios, we are able to compare the explanatory weight of our factors. For example, to assess how well class explains fearfulness, we measure: (a) how likely a passage will associate happiness with its location when centred on an upper-class place; and (b) how likely it will associate happiness with its location when *not* centred on an upper-class place. Dividing these two likelihoods (a/b) produces an odds ratio.⁷ Because odds ratios require categorical data, it was necessary to translate our continuous data into discrete categories. First, we aggregated Booth's seven class distinctions into three.⁸ Then, we divided the age of locations into pre-1485 (Roman and medieval) and post-1485 (Tudor, Stuart and later London). We also transformed our emotional and setting

7 For example, passages centred on upper-class locations are: (a) 17.6 per cent likely to associate happiness with their place; whereas passages that are not centred on upper-class are only (b) 10.7 per cent likely to associate happiness. Dividing (a) by (b) produces an odds ratio of 1.65, indicating that passages about upper-class locations are 1.65 times more likely to associate happiness with their places than are passages not about upper-class locations.

8 The first category (gold) was considered upper-class. The next two (red and pink) were considered middle-class. The next four, the wealthiest of which is the first to mention 'poor', represented the lower classes. To discretely categorise this quantitative data, of the percentage of pixels in each of these three classes, we used the following cut-offs: Upper-class = 10 per cent or above for upper-class pixels. Middle-class = 35 per cent or above for middle-class pixels. Otherwise, the place was considered lower-class.

Table 1.1 Social and narratological factors most strongly associated with fear.

<i>Factor</i>	<i>Likelihood of fear when factor is absent</i>	<i>Likelihood of fear when factor is present</i>	<i>Odds Ratio</i>	<i>Examples of Places</i>
Type: Hill	4.0%	17.5%	4.43	Tower Hill, Ludgate Hill
Type: Prison	3.7%	14.6%	3.98	Fleet Prison, Newgate, The Savoy Prison
Type: Government	4.1%	9.5%	2.33	Guildhall, Old Bailey
Space: City	3.3%	7.6%	2.31	Leadenhall Street, Thames Street, The Monument
Set: Setting	3.1%	5.6%	1.79	(Almost all)
Era: Pre-1485	3.3%	4.9%	1.49	Bedlam, Newgate, Smithfield, Tyburn, The Tower
Type: Market	4.1%	5.8%	1.42	Billingsgate, Smithfield

data. A passage was considered to contain fear or happiness if five or more of the 10 respondents considered it to have the respective emotion. Similarly, a passage was considered to be set in its location if 10 or more of the 20 respondents considered it to be so. The factors that most significantly increase the likelihood of a passage to express fear are:

This table reveals a strong correlation between a place’s social function and the degree of fearfulness attributed to it. A passage centred on a prison is about four times more likely to be fearful than a passage not centred on a prison. Of the two hills found to be even more strongly associated with fear, both have prisons associated with them. Ludgate Hill shares its name with a prison, whereas Tower Hill, sitting outside the Tower of London, served as a site of execution until well into the eighteenth century. Similarly, one of the two places classified under ‘government’, the Old Bailey, is a criminal justice court. The final association with social function, between fearfulness and the marketplace, primarily owes its place on the chart to Smithfield and Billingsgate. Smithfield was an execution site before it became a cattle market, whereas Billingsgate was infamous for its vulgarity and served as a household word for crassness.

An identifiably Foucauldian theme runs through these powerful factors for fictional fear in London: discipline and punishment. Despite the apparent obviousness of this association, it seems worthwhile to reconsider Foucault’s description of the transfer of juridical power, from the penal institution to the entire social body at large, through the affective geography of literary

representation (Foucault 298). If literary representation does indeed reinforce social power, then the nexus of fearful passages set near or within legislative institutions, such as prisons, courts and government offices, fulfils the social function of the institution whilst, in exchange, the affective experience of the text gains legitimacy through association with real-world sites of social discipline.

Beyond disciplinary sites, fear takes place in the City significantly more often than not. Interestingly, this spatial form of the past – London’s original expanse with its oldest buildings – is more strongly associated with fear than medieval and Roman locations by themselves. The City, in other words, seems more productive of fear than would be expected from its association with the past. Perhaps this combined spatio-historical identity of the City helps explain why, in the *Atlas of the European Novel*, the only Gothic novel set in London is set in Renaissance London, before any large-scale development of the West End had occurred (Moretti 16).

In contrast to the disciplinary functions of sites of fear, the table of odds ratios for happiness (Table 1.2) reveals that it is primarily associated with churches, theatres, squares and parks. Although the role of weddings in the happiness of churches is strong, these places also seem to share a common role: they all produce a reciprocal social space in which one sees and is seen. The sociality noticed in the ‘happy’ passages articulates itself primarily in these places. Moreover, it is again social function that is more strongly associated with happiness than is the geography of the West End. At the same time, this spatial division of the City and the West actually articulates our observed emotional polarity of fear and happiness better than the more nuanced geography of class embedded in Booth’s map. Because of the aristocratic impetus for the development of many of London’s post-medieval iconic locales, modern and upper-class locations largely overlap, so it is not unexpected for them to have an almost equal odds ratio.

Still, the fact that modern, upper-class locations are significantly more likely to be represented as happy clarifies the relationship between readers and the fictional geography of the texts they consumed. Above all, the upper-class locales that are correlated with happiness would be *familiar* to the eighteenth- or nineteenth-century English reader. Whether because these social spaces were the locations in which middle- and upper-class residents of London themselves would socialise, or because they would be recognisable as famous London locales to readers outside the city, these locations carry positive associations that predominantly middle- and upper-class consumers would recognise (St Clair 114–5). This familiarity is intimately connected with the tendency of these places to carry names that reflect the actual geography of London. In contrast, many lower-class locations such as slums were likely unfamiliar by name to even those readers who resided in London. Perhaps, then, the displacement of slums into purely invented proxies (for example, Dickens’ Tom-All-Along’s) provided a locus for the fearful affect without requiring any previous knowledge of

Table 1.2 Social and narratological factors most strongly associated with happiness.

<i>Factor</i>	<i>Likelihood of happiness when factor is absent</i>	<i>Likelihood of happiness when factor is present</i>	<i>Odds Ratio</i>	<i>Places</i>
Set: Setting	8.2%	17.5%	2.13	(Almost all)
Type: Church	11.6%	24.6%	2.11	St. George’s Church, St. Paul’s Cathedral
Type: Theatre	11.8%	23.5%	2.00	Covent Garden Theatre, Drury Lane Theatre
Space: West	8.3%	15.2%	1.82	Bloomsbury, Brompton, Chelsea, Hampstead, Hyde Park, Notting Hill, Strand
Type: Square	11.5%	19.2%	1.67	Berkeley Square, Grosvenor Square, Portman Square
Era: Post-1485	9.2%	15.3%	1.66	Bond Street, Marylebone, Mayfair, Piccadilly, Portland Place
Booth: Upper	10.7%	17.6%	1.65	Belgravia, Harley Street, Knightsbridge, Kensington Gardens, Regent’s Park
Type: Park	11.8%	17.3%	1.46	Hyde Park, Kensington Gardens, Regent’s Park

the specifics of any given slum. Positive affect, on the other hand, is associated with specific places whose nominal articulation could already perform a large part of the affective work.

However, urban factors are not as strongly associated with happiness as is a factor of narrative form: setting. We have seen how passages set in their named locations (‘set passages’) are significantly more likely to be either fearful or happy, rather than neutral. Evaluating fear and happiness together, set passages are more than twice as likely to associate emotion with a location. Narrative setting, in its phenomenological immediacy, seems deeply connected to emotionality. This result lends evidence to our project’s premise: fictional representations of emotion can not only be mapped, but this mapping is also intimately connected to narrative. If the set-ness of a passage, in its spatio-temporal localisability, actually calls forth emotion, mapping these spatio-temporal moments seems uniquely important for understanding the relationship between place and emotion within narrative.

Setting is also the only factor associated with both fear and happiness. No selection of places – by function, class, era or location – is similarly bimodal: setting situates itself in the middle of this emotional polarity. We can visualise this mediating position diagrammatically by translating the data from Tables 1.1 and 1.2 into the network shown in Figure 1.3. Two factors are linked if they are associated with each other, and the thickness of the line indicates the strength of association.

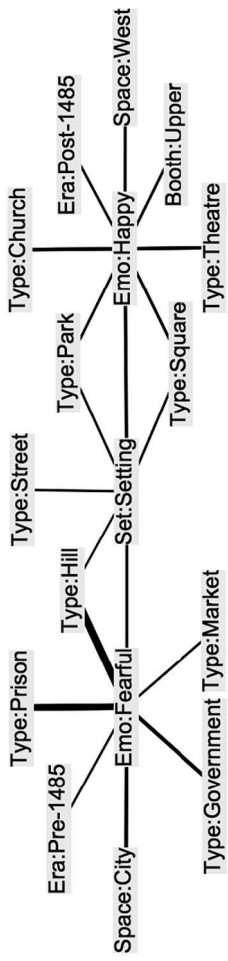


Figure 1.3 Odds ratio network built from Table 1.1 and Table 1.2.

Source: © The Authors.

From this network, we can see how starkly polarised the affective-geographic system of fictional London really is. Sites of fearfulness are never also sites of happiness. Fear and happiness – through their associations with the functions, spaces and eras of London places – essentially articulate two different Londons. Fearfulness can be located in a constellation of prisons, markets, courts of law and the ancient buildings of the City. Happiness is found in the constellation of parks, squares, theatres, churches and the modern buildings of the West. Setting is the only link mediating these two ‘half-Londons’ (Moretti 107). Interestingly, what makes possible this mediating role is setting’s relationship to emotionality as such. Set passages are more likely to associate emotion with their location; but unlike every other factor, they are not strongly associated with a *particular* emotional valence. If setting can be said to give rise to emotional expression, it can also be said to make possible and mediate the emotional polarity that so powerfully structures the fictional geography of London.

Conclusion

What do we gain from mapping the spatial and affective geographies of fictional London? Spatially, we’ve seen some evidence for a chronological conservatism to London’s fictional representation, a conservatism we’ve called stuckness. This stuckness in history implies that population growth did not substantially alter the imaginative contours of the city. Moreover, we have seen that this ‘stuck’ spatial system harbours a hidden social-affective logic. The modern, upper-class and public-space locations in the West End cluster together representations of the social pleasures of modernity, whereas the pre-modern and disciplinary sites of the City cluster together representations of vehement fear.

The very simplicity and precision of this rendering of London ultimately belies the possibility of a more emotionally ambiguous relationship to urban modernity. Although slums such as Clare Market and Old Nichols are occasionally represented fearfully, urban fear seems preoccupied with the ancient and juridical institutions of London, in a manner not unlike the Gothic novel. Representations of the horrors of modernity, when they occur, are likely relegated to the Tom-All-Along’s of London: authorial inventions without a precise real-world referent. In contrast, representations of the pleasures of modernity rely heavily on the existing urban geography of the West End, with its nominative parks, squares and theatres. Not coincidentally, these are also upper-class spaces. The correlation we have observed between class and affect may thus also help explain the readiness, or lack thereof, with which fiction engages with existing urban spaces. Finally, we have discovered that narrative setting plays a central role in London’s fictional geography – by mediating both fearful and happy emotions, setting makes possible the emotional polarity that structures so many literary representations of London.

Stepping back from London to look at the technologies that have enabled our research, what have we learned about the capabilities and limitations of a digital literary geography? Through a combination of algorithmic and reading-based methods, we were able to uncover a literary geography of London as it evolved over two hundred years of fiction. Algorithmic methods have allowed us to track hundreds of place-names across thousands of texts. Equally, if not more importantly, reading-based methods have allowed us to do more with these places than simply locate them on a map. By annotating for setting and emotion, we designed maps that deepen and qualify our understanding of the ways in which London is represented in historical works of fiction. These reading-based annotations make possible nuanced questions about the meaning of places in fiction, expanding digital literary geography from one rooted in geographic investment to one able to qualify the nature of that investment. They also produce new layers of geographic information that interact both with each other and with socio-historical facts of London's geography, in ways that can be quantified and compared. But our methods also have important limitations, as is made evident by the differential visibility of fear within an explicitly named geographic space. In addition, our turn to crowdsourcing methods and Amazon's Mechanical Turk revealed the potential advantages of a large group of readers distributed across a corpus of texts; however, the for-profit aspect of the platform also introduced potential complications, as our results were subject to potential manipulation by participants seeking to maximise their individual profit.

Literary interpretation on this scale and to this level of complexity would not have been possible without the combination of technology and close critical attention that we describe. By informing our quantified crowdsourced data with our specific disciplinary and historical understanding of London, we are able to reveal a complex web of socio-cultural, historical, economic and narratological factors that relate emotion to place within fictional representations of the city. Digital literary geography has opened up for us not just Frances Burney's or Dickens' London, but rather a whole metropolis as mediated by the structures of feeling embedded in two centuries of fiction.

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