CHAPTER 7

Best Practice for Forensic Fishing: Combining Text Processing with an Environmental History View of Historic Travel Writing in Loch Lomond, Scotland

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Scenic landscapes are a main attractor for local and international tourism, and in many cases have become designated as protected areas such as national parks or scenic areas that promote their aesthetic qualities to attract visitors. But what directs touristic attention to certain landscapes, and to specific places within such landscapes? We argue that in order to find out how touristic landscapes come into being, we need to turn our focus on how such landscapes become constructed as idealised landscapes.

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This chapter is based on the idea that we can trace the construction of landscapes as touristic places through historic text sources, and explore how these texts work in creating a scenic identity of landscape. We take as an illustrative example the Loch Lomond area in Scotland, and examine the 'origin stories' of the scenic sites in accounts of guide/travel books from the late 18th and 19th centuries, exploring the way in which their landscape identities were formulated.

We have developed a hybrid approach that combines qualitative text analysis and interpretation with more quantitative analysis using Natural Language Processing tools. By conducting this parallel 'forensic fishing' activity, we are looking to ascertain two things: firstly, what might be 'missing' from a strict linguistic analysis in terms of historical context or 'buried' information hard to decode from the data alone and, secondly, how the data from a quantitative linguistic analysis might embellish, challenge and/or inform a conventional methodological/archival trawl using environmental humanities techniques. We found that to the environmental historian, these guidebooks show a tourist landscape under construction, crafting a consistent narrative of celebrating the wild and the romantic. This is communicated via a recurring phraseology and a clear choreography of the visitor experience.

The analysis of these sources through the use of automated language processing tools offers insights into the recurring terminology used to describe landscape experience, and allows quantitative comparisons to be made between different sources. However, these methods do not address the issue of concealed messages buried deep in the text, or inferred by illustrations, appendices and supplementary material. These glimpses are important since they offer useful hints as to the hidden stories to be told beyond the dominant narrative about a world of elite travel in Loch Lomond.

In the following, we outline the hybrid approach that we used to trace the emergence of Loch Lomond landscapes as iconic touristic places through historical travel writing. We start by describing our procedure for finding relevant source material and processing this digitised text material to compile a corpus. We then describe the processing steps we took to analyse these texts using the text analysis toolkit 'General Architecture for Text Engineering' known as GATE (Cunningham, Maynard, and Bontcheva, 2011). Using examples, we show how text analysis in GATE can assist and complement a close reading of these texts. Finally, we highlight how different methodological and disciplinary lenses can be applied and combined for examining the origin stories and historic landscape experiences of historic travel writers in Loch Lomond.

7.1 Finding Relevant Sources and Compiling a Corpus of Digitised Travel Descriptions

Data collection is a critical consideration, both in the definition of our research goals and in the design of our experimental study. In order to find relevant material enabling our research questions to be answered, we need to consider the following questions: where can we find digitised historic texts? Are the texts we find biased in terms of coverage; do they cover sufficient material; are they focused on the topic we want to investigate? And finally, do the texts contain relevant material that will allow our questions to be answered?

Our task can be considered as a 'fishing experiment', since we do not necessarily know what we might uncover until we start looking for it. We therefore started with a selection of texts, and used linguistic tools to initially sift through them, enabling us to then zoom in on relevant material with respect to our research question. The sample corpus was selected from the online archives[1] and project Gutenberg[2] using a date-limited search (earliest) of 'Loch Lomond' (text sources only), with a range intended to include different authors and as many guidebooks as possible. The following criteria were thus applied: only text sources were selected (as other source types cannot be processed automatically using our methodology); the 'first' publication date versions of each guidebook were selected; and a date cut-off of 1895 was applied to limit sample size. Using these criteria, we compiled a small corpus consisting of eight digitised works:

1. Journey to the Western Isles, Johnson and Boswell (1785)
   https://www.gutenberg.org/files/2064/2064-h/2064-h.htm
2. The picture of Glasgow, and strangers' guide; with a sketch of a tour to Loch-Lomond, R Chapman (1818)
   https://archive.org/details/pictureofglasgow00unse/page/n9
3. The Steam-boat Companion; and Stranger's Guide to the Western islands and Highlands of Scotland, James Lumsden & Son (1820)
   https://archive.org/details/bub_gb_x5sHAAAAQAAJ/page/n4
4. Guide to the romantic scenery of Loch-Lomond, Loch-Ketturin, the Trosachs, James Lumsden, (1831)
   https://archive.org/details/guidetoromantic00songoog/page/n5
5. Black's Guide to the Trossachs (1853)
   https://archive.org/details/blacksshillinggu00ediniala/page/n4
6. Nelson's Tourist Guide (1858)
   https://archive.org/details/nelsonstouristsg00thom/page/n2

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[1] http://www.archive.org
[2] http://www.gutenberg.org

7. Edinburgh & Glasgow to Stirling: Doune, Callander, Lake of Menteith, Loch Ard, Loch Achray, the Trosachs, Loch Katrine, Loch Lomond, Keddie and Gray (1873)
   https://archive.org/details/edinburghglasgowkedd/page/n13
8. Shearer's Guide to Stirling, Dunblane, Callender, the Trossachs and Loch Lomond, Shearer (1895)
   https://archive.org/details/shearersguidetos00shea/page/2

We then compared this selection of sources to British Library holdings and Wikipedia in order to check whether we were missing relevant non-digitised sources. In doing so, we identified several non-digitised works at the British Library, including the Guide to Loch Lomond (Richardson, 1798); Baird's Guide (Baird, 1853), Brydone's Guide (Brydone, 1856); and Shaw's Tourist's Picturesque Guide to the Trosachs, Loch Lomond, Central Highlands (Shaw, 1878). It is important to acknowledge that our corpus is thus a sample only of historic texts of Loch Lomond which are digitised. A more detailed analysis of historic travel writing about the Loch Lomond area should include these non-digitised texts, which could be analysed in an analogous manner or digitised using Optical Character Recognition (OCR) methods, and then be included in the sample. However, for our initial exploratory analysis, we limit ourselves to the available digitised text sources.

7.2 Forensic Fishing in Digital Text Sources Using Natural Language Processing

It is generally very time-consuming for researchers to manually read a number of books and find relevant parts that warrant a closer reading, as well as manually counting the words and their relations to each other. But natural language processing (NLP) approaches can, with some guidance, be used to sift through this large amount of data and quantify the occurrence of certain words or parts of words, which is useful even for a small number of sources. In our approach for text analysis, we use automated tools to find the 'interesting' parts of the documents, which can then be passed to domain experts for manual analysis, and to count the occurrences of descriptive terms that we were interested in that relate to scenicness and aesthetic perception of landscape.

7.2.1 Processing digitised historic texts in GATE to identify landscape terms and place names

Because our corpus is historical, and therefore compiled primarily from text that has been digitised using OCR methods, some initial cleaning of the data was necessary. We manually removed some of the extraneous text denoting advertisements, indexes and so on. We also separated the text into smaller parts,

since a whole book as a single document is rather large for processing within the GATE toolkit. This separation can be done manually, or in our case, we used a script that executes a program in Python that automatically separates the single text documents of one book into smaller segments that are easier to analyse.

Once the data was cleaned, we then ran some basic linguistic processing tools through the data collection using GATE. This enabled us to capture words, sentences, paragraphs and parts-of-speech (noun, verb, adjective, etc.). Next, we ran Named Entity Recognition (NER) tools to determine to which categories the identified entities belonged (e.g., whether a noun is a reference to a person, a place name or a landscape feature). We used the default ANNIE NER tool implemented in GATE, which we customised slightly to improve recognition of geographical features, which is not implemented in ANNIE as a default. To do so, we used a list of English terms that describe landscape features. This list contained landscape elements (e.g., *forest, bridge, house, village, river*), qualities that modify these elements (e.g., *beautiful, blue*), as well as activities related to landscape experience (e.g., *walk, walking, hike, hiking, view, viewing*). This list of single words had been compiled from a contemporary data source consisting of social media photographs with associated keywords (tags) in previous research (Purves, Edwardes, and Wood, 2011). As this list reflected contemporary terms, we adapted the original list to our historic corpus by removing words such as 'disco' or 'skyscraper', resulting in a new list of 365 words. We used this list as an initial gazetteer to tag mentions of landscape terms in the historic text data (Annex 1).

abandoned	butterfly	ditch	grassy	mills	reservoir	sunny
abbey	byway	dock	grave	mine	restored	sunrise
access	cairn	docks	gravel	mist	ridge	sunset
agricultural	camp	downs	graves	monument	river	sunshine
air	camping	downstream	gravestone	moon	road	swan
allt	canal	drainage	graveyard	moor	roads	swans
ancient	carriageway	duck	grazing	moorland	roadside	thatched
animal	castle	ducks	grove	moors	robin	tide
animals	cathedral	dyke	hamlet	moss	rock	timber
apple	cattle	edge	harbour	mount	rocks	tomb
arable	cemetery	estuary	haven	mountain	rocky	tourist
arch	cemetery	farm	hay	mountains	roman	tower
arches	chalk	farmhouse	headland	mouth	rough	town
arena	channel	farming	heath	mud	route	track
ash	chapel	farmland	heather	muddy	ruin	tracks

Annex 1: List of landscape terms.

attractive	church	farms	hedge	oak	ruins	traditional
autumn	churches	fauna	heritage	outdoor	rural	trail
bank	churchyard	fell	hiking	outdoors	sailing	train
banks	clay	fen	hill	overgrown	sand	trains
bar	cliff	fence	hills	palace	sands	tree
barn	cliffs	ferry	hillside	panorama	sandstone	trees
barns	climbing	field	historic	park	sandy	tributary
barrow	cloud	fields	history	pass	scenery	upstream
bay	clouds	fire	horizon	pasture	sea	vale
beach	clough	fish	horse	path	seafront	valley
beautiful	coal	fishing	horses	paths	seaside	view
beauty	coast	flood	hut	peak	sheep	viewpoint
beck	coastal	flooded	ice	peat	ship	village
bed	coire	flora	inn	pier	shore	visitors
beech	colliery	flower	insect	pine	signpost	walk
beinn	copse	flowers	island	pit	sky	walkers
ben	cottage	flowing	isle	plant	skyline	walking
bench	cottages	flows	isolated	plantation	slope	wall
bend	countryside	fog	junction	plants	slopes	walls
birch	cove	footbridge	lake	ploughed	snow	water
bird	cow	footpath	landscape	pond	spire	waterfall
birds	crag	footpaths	lane	pool	spring	waves
boat	crags	ford	leaf	port	squirrel	weather
boats	croft	forest	leaves	priory	stars	weir
bog	crop	forestry	lighthouse	quarry	station	well
boggy	cross	fort	limestone	quay	steep	wet
botanical	crossing	frost	loch	quiet	stile	wheat
boundary	crossroads	gap	lochan	railroad	stone	wild
branch	cutting	garden	lock	railway	stones	wildlife
bridge	cwm	gardens	locks	railways	storm	wind
bridges	cycle	gate	lodge	rain	stream	windmill
bridleway	cycling	gates	manor	rainbow	street	winter
brook	dale	gateway	marina	range	streets	wood
building	dam	gill	marsh	rebuilt	summer	wooded
buildings	deer	glen	meadow	reflection	summit	wooden
burn	derelict	gorse	meall	reflections	sun	woodland
busy	disused	grass	mill	reserve	sunlight	woods

Annex 1: *(continued).*

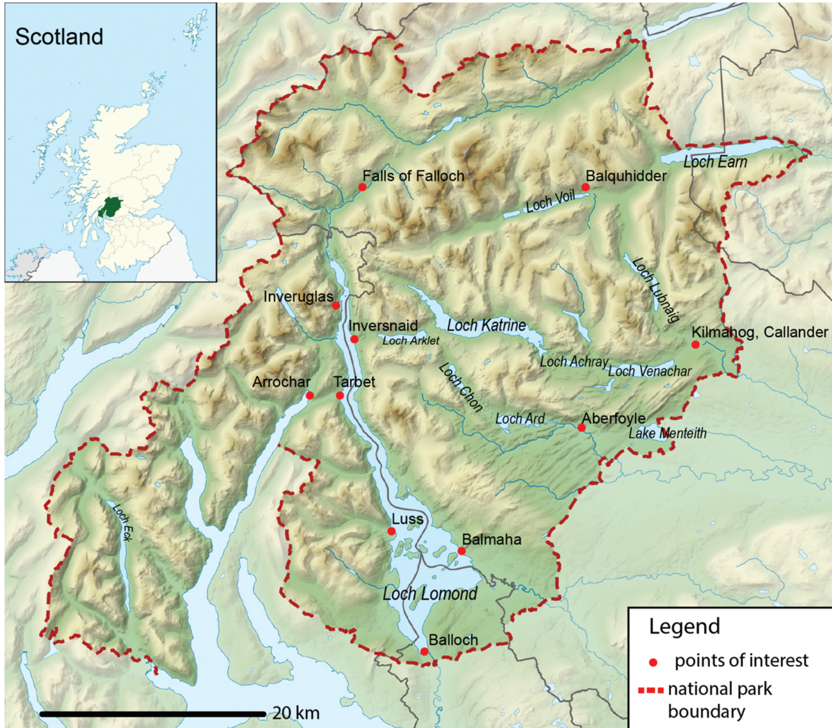

Figure 7.1: Map of Loch Lomond and The Trossachs National Park study area (base map credit: Wikimedia user Nilfanion, map created using Ordnance Survey open data CC-BY-SA-3.0).

Finally, we were interested in identifying sections within these books that specifically talk about landscapes and places in the Loch Lomond area. For this, we used the boundaries of the Loch Lomond and the Trossachs National Park to define our study area, which is rooted in contemporary perception of the National Park as a spatial unit (Figure 7.1).

We recognise that historically, the landscapes that travellers traversed on a journey to the Loch Lomond area also incorporated areas not included in the National Park, such as Stirling, which we excluded from our analysis. We therefore compiled a list of place names for Loch Lomond using the Loch Lomond and The Trossachs National Park homepage to compile a list of 56 place names (settlements and points of interest) as well as a list of 20 names for water bodies (e.g., Loch Lomond, Loch Arklet). We also imported a list of names for Scottish mountains from Wikipedia to recognise references to mountains in Loch Lomond. After we compiled these gazetteers or lists of names (Annex 2), we ran the GATE application over all our texts to identify mentions of these words (Figure 7.2).

Tyndrum	Crianlarich	Stronachlachar	Inversnaid	Ardlui
Inverarnan	Inveruglas	Tarbet	Arrochar	Inverary
Lochgoilhead	Rowardennan	Inverbeg	Garelochhead	Luss
Inchmurrin	Helensburgh	Arden	Balloch	Killin
Balquhidder	Lochearnhead	Strathyre	St. Fillians	Brig o'Turk
Brig O'Turk	Callander	Thornhill	Port of Menteith	Doune
Kinlochard	Aberfoyle	Garmore	Balmaha	Drymen
Gartocharn	Glen Dochart	Duke's Pass	Inchcailloch	Falls of Falloch
Puck's Glen	Falls of Dochart	Bracklinn Falls	Falls of Leny	Falls of Edinample
Edinample Castle	Clarinsh	Inchfad	Inchtavannach	Inchmurrin
Inchlonaig	Inchconnachan	Buchinch	Inchmoan	Inchgalbraith

Annex 2a: List of place names for Loch Lomond and The Trossachs National Park. Settlements and places of interest.

Loch Iubhair	Loch Dochart	Loch Voil	Loch Doine
Loch Venachar	Loch Lubnaig	Loch Lomond	Loch Long
Loch Katrine	Holy Loch	Loch Goil	Loch Earn
Loch Arklet	Lake of Menteith	Loch of Mentieth	Loch Reòidhte
Loch Drunkie	Loch Achray	Loch Ard	Loch Chon

Annex 2b: List of place names for Loch Lomond and The Trossachs National Park. Water bodies.

7.2.2 Identifying relevant texts containing landscape descriptions of the Loch Lomond area

For our analysis, based on the annotations, we first focused on identifying passages containing landscape descriptions of the study area of Loch Lomond by searching for mentions of place names located within the study area that co-occurred with a concentration of landscape terms. Using the number of annotations of landscape terms and Loch Lomond place names in relation to the number of all tokens in a text file allowed us to quickly zoom into text files that were most likely to contain landscape descriptions that were of interest to us. For instance, for the source of Keddy and Gray (1873), this ratio indicates that the text files number 4, 5 and 6 (marked in bold in Table 7.1) contain considerably more relevant terms than others, also when compared to the overall tokens in the text file. These are thus good candidate text files that we want to look at for our more in-depth analysis.

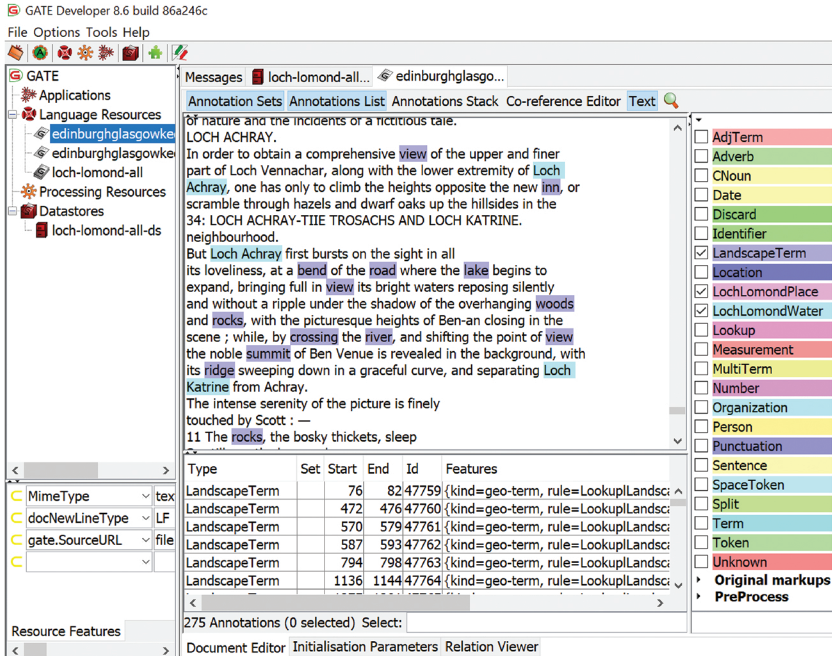

Figure 7.2: User interface of the GATE toolkit highlighting the annotated terms (landscape terms and Loch Lomond place names for settlements and water bodies – see Annex 1 & 2 for full list of search terms used).

However, there may also be passages within those files with lower ratios that might be highly relevant, but which get missed by the first method because those texts do not contain the relevant place names or have only few landscape terms. We therefore perform a second pass manually. Using the GATE toolkit to highlight Loch Lomond place names and landscape terms (Figure 7.2), we visually identified text passages where these co-occur. Taking this approach, we also identified relevant passages, for instance in text file number 3 (Figure 7.2) that contained 21 place names from our study area and 254 landscape terms (Table 7.1).

Using this approach, we compiled a sub-set of documents from each travel guide for more in-depth qualitative analysis ('close reading'). The examples cited below are taken from these text passages highlighted as containing high ratios of relevant place names and landscape terms compared to the overall term count.

We highlight below some examples of approaches that combine a close reading approach of these relevant texts with more quantitative approaches ('distant reading') of the entire corpus. Our examples illustrate how these approaches can be applied and combined to generate initial insights on how the landscapes of Loch Lomond and The Trossachs were experienced and described in historic travel accounts.

Nr.	Number of all place names	Number of Loch Lomond Place Names	Number of landscape terms	Number of tokens in text file	Ratio between landscape terms and Loch Lomond place names to all tokens
1	126	11	100	4277	0.026
2	115	**20**	**234**	7047	**0.036**
3	119	**21**	**254**	7402	**0.037**
4	145	**66**	**402**	8220	**0.057**
5	160	**82**	**244**	7272	**0.04**5
6	128	**54**	**269**	5668	**0.057**
7	45	6	98	2581	0.040
8	235	50	100	4957	0.030
9	79	0	12	2602	0.005
10	309	7	16	4040	0.006
11	79	1	13	3822	0.004
12	201	29	39	5511	0.012

Table 7.1: Number of annotated terms identified through gazetteer lookup.

7.2.3 Application example 1: Tracing the emergence of touristic hotspots in Loch Lomond and the Trossachs

One focus of our exploratory analysis was to identify recurrent mentions of places across different guide books and authors. GATE allows us to quickly identify the number of place names from Loch Lomond and the Trossachs in each text document. Because many place names are repeatedly used in describing a certain geographic extent, we can also extract the place names themselves in the order in which they are described. This allows us to analyse which routes the travel writers were following. It is noteworthy that most guides follow a predescribed route that traces previous literary work of the area, most notably that of Sir Walter Scott and his poem 'The Lady of the Lake', which popularised the landscapes of Loch Lomond and the Trossachs for tourism:

> *'[...] there are scenes so grand, so magnificent, and so exquisitely beautiful, that it is a matter of surprise they lay unnoticed and comparatively unknown in the midst of our land, like buried gems, till near the beginning of the present century, when Sir Walter Scott's matchless poem "The Lady of the Lake," flashed across the length and breadth of Britain, and invested the Trosachs with an interest which, we are persuaded, shall never die away.'* (Nelson's Tourist Guide, 1858)

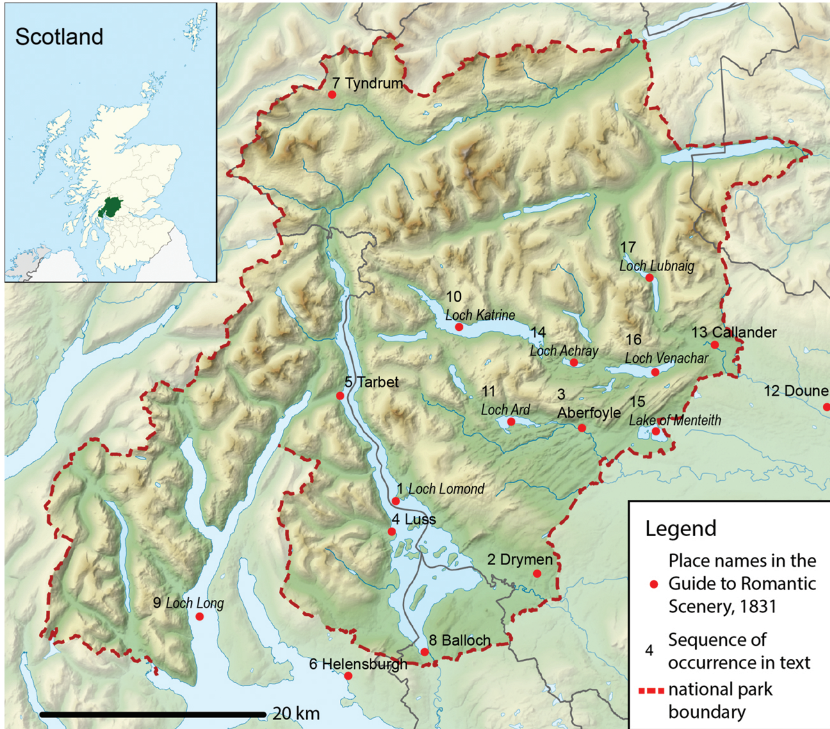

Figure 7.3: Places within the study area mentioned in the 'Guide to Romantic Scenery' numbered according to first occurrence. (base map credit: Wikimedia user Nilfanion, map created using Ordnance Survey open data CC-BY-SA-3.0).

For further analysis, we mapped the identified place names of our study area in a Geographic Information System and compared these maps between the different writers (Figures 7.3 & 7.4). This follows a methodology that has been previously applied in the field of Digital Humanities to highlight spatial differences between the journeys of different writers, for instance, in the English Lake District (Donaldson, Gregory, and Taylor, 2017a; Gregory and Donaldson, 2016). For our approach, we extracted for each of our documents the place names that were matched in our gazetteer of Loch Lomond and The Trossachs place names. In case these were mentioned several times in a document, we chose to use the first occurrence of each place name, and numbered the place names according to the sequence in which they occurred in each document. We then assigned coordinates to each place name using the GeoNames gazetteer[3] with a focus on the UK. We manually disambiguated terms where two or more

[3] http://www.geonames.org/

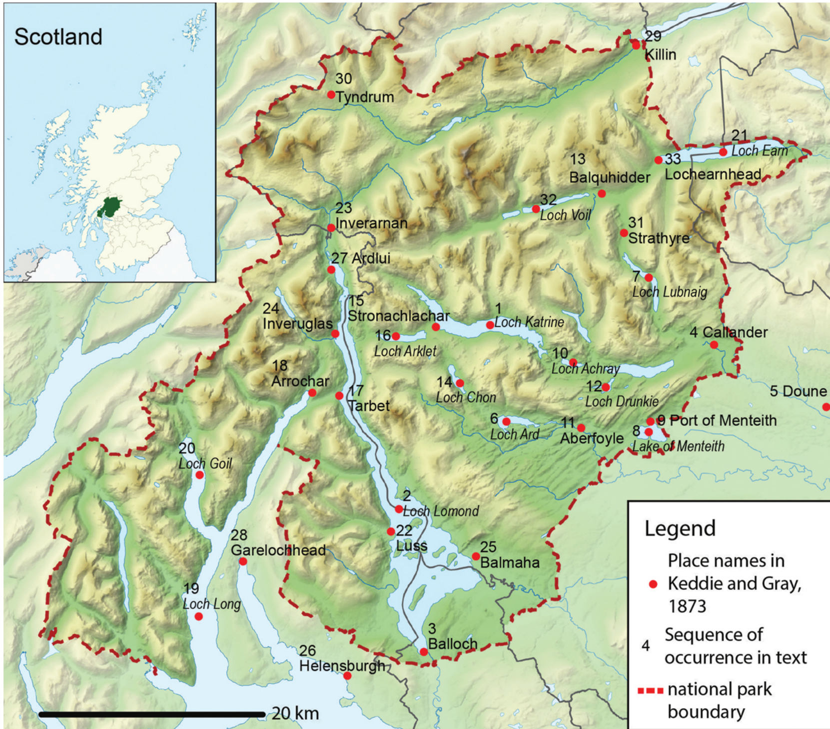

Figure 7.4: Places within the study area mentioned in the 'Keddie and Gray' numbered according to first occurrence. (base map credit: Wikimedia user Nilfanion, map created using Ordnance Survey open data CC-BY-SA-3.0).

matches were found within the UK (e.g., for Balloch we chose the settlement in West Dunbartonshire and not Balloch as a populated place in the Highlands). For place names where there was no match in GeoNames, we manually added the coordinates that were returned by Google Maps. In the open source Geographic Information System QGIS (QGIS Development Team, 2018), we displayed the coordinates on an OpenStreetMap base map and labelled them in the order in which they occurred.

Taking the map of place names from the Guide to the Romantic Scenery (Figure 7.3) and comparing it with the Guide by Keddie and Gray, we observe that fewer place names from our list occurred in the Guide to Romantic Scenery, and that they focused on the South and South East of what today is the Loch Lomond and The Trossachs. In Keddie and Gray, the place names found also include the north-eastern part of the study area around Loch Earn (Figure 7.4).

Looking at the sequences of place names, there often did not seem to be an understandable pattern (Figure 7.5). This contradicts our finding from our more close-reading work, where we observed similar trajectories being

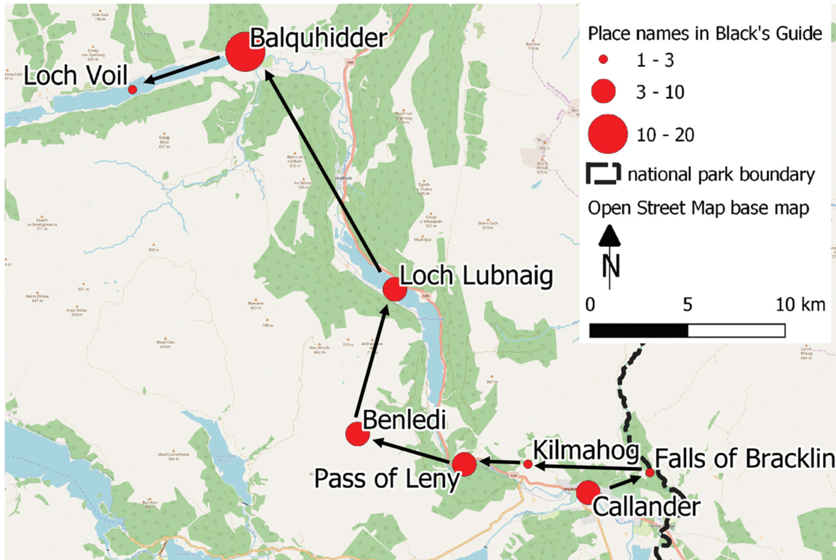

Figure 7.5: Sequence of places names in a subsection of 'Keddie and Gray' scaled according to the number of mentions. Basemap © OpenStreetMap contributors.

described. Going back to the original text sources this is explained by the fact that many guidebooks provide a summary of the travels at the beginning, such as in Keddy and Gray:

> *Starting from Glasgow, the tourist has the choice of proceeding by railway to **Balloch**, thence sailing up **Loch Lomond** to **Inversnaid**, then crossing the country by coach to **Loch Katrine**, proceeding thence to **Callander**, where the train may be taken either for Glasgow or Edinburgh.*

As we selected the first occurrence of each place name, we thus mapped the introduction section that mentioned a low granularity 'broad-brush' geographic description. Or, as in 'Nelson's', the section on Loch Lomond starts with a mention of historical figures such as Rob Roy and places that were important in their lives, which does contain places that were necessarily visited by the writers. For a more detailed analysis, it would therefore be important to distinguish between places mentioned in the guidebooks and places visited by the writers (Cooper and Gregory, 2011). In order to better map the travels of the writers in a spatial sense, we chose to focus on a subsection of one of the guidebooks for illustrative purposes, also manually annotating additional place names which we had missed by using a simple and limited gazetteer.

This second case study focused on the sections in Black's Guidebook that described the geography around Callander and Balquidder. We manually

searched for all the locations in the document and annotated their first occurrence, as well as the number of occurrences thereafter for places that were visited. After mapping this itinerary and scaling the symbol for each place name according to the frequency of mentions in this section of the document, we identified three additional place names that were not contained in our gazetteer: *Falls of Bracklin, Pass of Leny and Benledi* (a hill), which we also then manually georeferenced using Google Maps.

According to this map, which has a finer granularity of the text due to its focus on a smaller section within a guide book, we are able to observe a finer spatial granularity of the travels described, which map out the route of Black's description of the Trossachs.

In addition to comparing the places and the succession in which they were visited by travel writers, it also proves fruitful to analyse how the same landscapes were described by different writers. For some of the recurrently mentioned touristic places, such as Loch Achray (Figure 7.6), we found that the descriptions were similar in the praises of the scenic experience the landscape offered. Loch Achray (Figure 7.3) is described in The Steam- boat companion; and Stranger's Guide to the Western islands and Highlands of Scotland (1820):

> *"Loch Achray, which is very romantic, being closely wooded from the brink of the water, to the top of the almost perpendicular hills that surround it."*

Figure 7.6: Contemporary view of Loch Achray (photograph by F. Wartmann).

Alternatively, Nelson's tourist guide (1858) describes Loch Achray as:

> *"[···] the glassy waters may be seen gleaming through the leafy curtain like a sparkling gem. On a calm evening the lovely scene wears an aspect of deep seclusion and tranquillity."*

However, we also found some cases of differences in descriptions. For instance, the transition between the Highlands and Lowlands around the town of Callander was described as *'the cold swelling moorlands which connect the Lowlands with the Highlands'* and the *'dreariness of the scenery is apt to be acutely felt'* in Black's Guide (1853). Callander itself was described as *'a mongrel sort of village, neither Highland nor lowland — some of the dirt and laziness it has of the former, and some of the hard stony and slaty comfort of the latter'* in Black's Guide (1853), but as *'worth a visit'* in The Steam-boat Companion (1820) and as *'beautifully situated upon the banks of the river Teith, immediately upon the confines of the Highlands, and surrounded with woods and scenery of the most romantic description'* in Lumsden's 'Guide to the romantic scenery of Loch-Lomond, Loch-Ketturin, the Trosachs' (1831). Such differences in the description of similar geographic areas are interesting because they offer glimpses into how different writers have perceived the landscape. On the one hand, such descriptions can then be compared between different writers within a certain time period (e.g., the Romantic period). On the other hand, these descriptions may also be taken together from different writers within a time period and compared to writings of a different time period in order to trace changes in landscape perception that may be linked with actual physical landscape changes.

7.2.4 Application example 2: Words about landscape – Analysing historic landscape descriptions through term co-occurrence

Another aspect worth highlighting is the possibility to use a text mining tool such as GATE to automatically locate mentions of particular terms that are used to describe landscape experience. For instance, our close-reading highlighted that landscape terms (e.g., *mountains, lake, scenery*) often seemed to be co-occurring with descriptors such as *picturesque, romantic, terrible* or *sublime*, as is exemplified in this passage from Chapman:

> *'Whatever, indeed, is beautiful, or fantastic, or wild, or picturesque, or sublime, or terrible, are associated in this celebrated region.'* (The picture of Glasgow, and strangers' guide; with a sketch of a tour to Loch-Lomond, R Chapman [1818] p. 314).

We therefore conducted a more quantitative analysis of the co-occurrences between our list of landscape terms and these landscape descriptors across our

entire corpus. Using the ANNIC tool in GATE which enables complex searches of patterns in annotated text, a list of all the landscape terms found in the corpus was compiled, based on the output of the original corpus annotation. We also manually compiled a list comprising relevant descriptors, for which we chose: *beautiful*, *picturesque*, *romantic*, *sublime*, *tranquil* and *terrible*. In GATE, we converted both lists into gazetteers and developed a set of simple JAPE rules (Cunningham, Maynard, and Tablan, 2000) to automatically annotate sentences which contained at least one example of both a descriptor and a landscape term. We developed an application comprising the gazetteer lookup and rules, and ran it over the annotated corpus. Using ANNIC, every occurrence of such a sentence in the corpus was extracted and exported to a spreadsheet. Finally, we used a Python script to find all co-occurrences of landscape and descriptor term within these extracted sentences, and output a co-occurrence pair for each, along with the document in which it was found. We then aggregated the documents according to the book from which they were derived (e.g., Shearer's Guide).

This analysis showed that the terms *beautiful* and *picturesque* co-occurred most often with landscape terms, but with some differences between authors (Table 7.2). For example, when normalising the number of co-occurrences with the total number of tokens to compare between authors, Shearer's Guide and Nelson's Guide are highlighted as containing higher ratios of co-occurrences with the term *beautiful* than Chapman's, Black's or Keddie and Gray's guidebooks. Furthermore, The Guide to Romantic Scenery by Lumsden (1831) contains more co-occurrences of landscape terms with *picturesque* than with *beautiful* (Figure 7.7). The term *sublime* is much less used by these authors, and comparatively more so by Lumsden (both 1820 and 1831) and Chapman (1895). Differences between the use of landscape descriptors in historic travel writings was also reported for a corpus on the Lake District, where Donaldson, Gregory, and Taylor (2017) reported differences in the frequency of use of the descriptors *beautiful*, *picturesque*, *sublime* and *majestic* between works from the Romantic period and the Victorian era.

Examples from our corpus indicate that an analysis of such terms always has to take into account context, as we otherwise risk misinterpretations. For instance, the terms may be negated (e.g., 'anything but picturesque') or be used in a manner where the descriptor does not describe the landscape terms, as exemplified in Black's guide to the Trossachs, 1853 describing the village (landscape term) of St. Fillans:

> *'It is altogether a show pet village, with its allotments and trellises of creeping flowers, and more adapted to the philanthropist than the searcher after the* ***sublime*** *and* ***terrible****.'*

In using the measure of co-occurrence, we are making an assumption that if a term such as *beautiful* or *picturesque* occurs together in a sentence with a

Black Shilling		Steam Boat Companion		Edinburgh andl Glasgow		Guide to Romantic Scenery		Nelsons		Picture of Glasgow		Shearer's	
scenery	1	scenery	10	lake	3	castle	1	stream	1	scenery	5	ruin	2
mountain	1	mountain	2	scenery	3	lake	1	view	1	castle	3	valley	2
		channel	1	mountain	2	landscape	1			village	2	castle	1
		loch	1	ruin	2	road	1			ascent	1	house	1
		mill	1	archipelago	1	rocks	1			mill	1	scenery	1
		rock	1	buildings	1	scenery	1			mountains	1		
		ruin	1	hills	1	village	1			river	1		
				rock	1					rock	1		
				town	1					site	1		
				woods	1					trees	1		
										valley	1		

Table 7.2: *picturesque*: Number of co-occurrences for landscape terms with the descriptor.

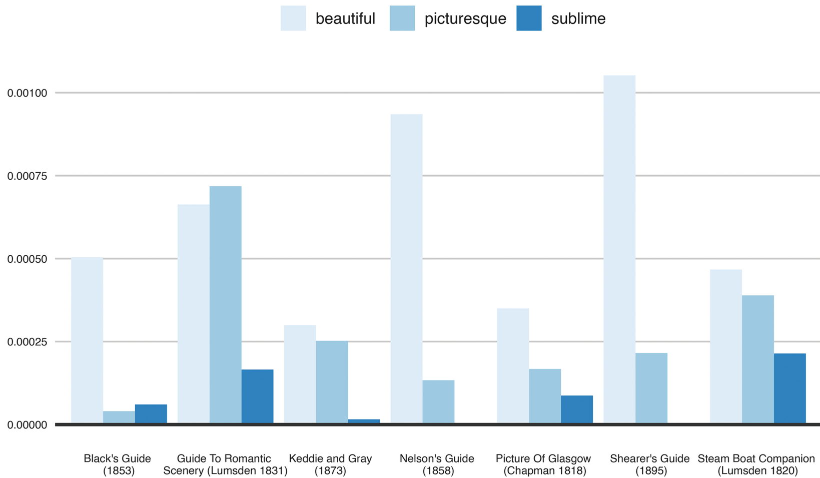

Figure 7.7: Frequencies of co-occurrences for *beautiful*, *picturesque* and *sublime* with landscape terms.

landscape term, then they are in some way related through the context of the sentence, such as '*Many **beautiful glens** are on the estate*' (Shearer's). Here, the terms *beautiful* and *glen* are grammatically and contextually related. However, in more complex sentences this is not necessarily the case, as in: '*the **beautiful** residence of Sir Patrick Murray, near which are the **falls** of the Turret, with the **glen** and **loch** of the same name*' (Picture of Glasgow), where *beautiful* refers to *residence*, and is not a descriptor of the landscape terms *falls, glen* or *loch*. Furthermore, this case also illustrates that we may find several landscape terms co-occurring with a single descriptor such as *beautiful*. In that case, it is unclear to which landscape term the descriptor refers to. To resolve this, full linguistic parsing would need to be added to the system in order to obtain grammatical relations. However, this introduces problems as it is not so reliable, especially on these kinds of texts. We therefore also conducted a manual analysis of the identified co-occurrences (e.g., Table 7.2), with two goals in mind. First, we wanted to determine in how many cases the co-occurrences of descriptor and landscape term reflected the semantic context of the sentence. Second, we used it to identify the landscape term(s) to which the descriptors referred.

Of a total of 326 co-occurrences, 264 were identified as reflecting a descriptor referring to a landscape term, indicating that co-occurrence within a sentence is a useful, albeit rough, approximation. Most co-occurrences referred to the scenic appreciation of landscape elements such as the lochs, mountains and rivers of Loch Lomond. In 39 cases, the landscape descriptor referred to 'scenery' and in 33 cases to 'view' or 'views'.

In contrast to scenic visual experiences, we found few mentions of acoustic experience. For example, the term *tranquil* only co-occurs with landscape terms

nine times in our corpus (four times are in Keddie and Gray and three times in Chapman 1818). Although the term *tranquil* encompasses both acoustic and visual experience, it serves as an indicator that visual experience dominates in touristic landscape descriptions of Loch Lomond. This is in contrast to work on a historic corpus of Lake District writing, where particular soundscapes, as well as quietness and tranquillity appear to have been more central to the experience of the landscape (Chesnokova et al., 2019; Taylor, 2018).

Through manual inspection of the documents in our corpus, we did find some examples for acoustic descriptions of rivers or streams, e.g.:

> *'It [the Keltic stream] does not flow through a valley, but tumbles, wild and brawling and speckled with foam, down a narrow rocky gorge, roaring and leaping as it goes, in a succession of dashing falls [···]'* (Nelson's Tourist Guide, 1858),

or:

> *'The roaring of the mountain torrents in a calm morning after a raining night was something quite delicious to my ears, and actually makes a kind of music, of which you dwellers in the plains can have no conception. From the platform before our door, we had twenty at least in sight, and more than a hundred within hearing; and the sort of thrilling they made in the air, with the mingling of the different waters, on the least swelling of the breeze, had an effect quite overpowering and sublime'.* (Keddie and Gray, 1873).

Several guides also describe specific locations where an echo can be produced at Loch Katrine and Loch Ard. The fascination with echoes by travellers especially in the late 18th and early 19th centuries has been described in detail for the Lake District, where travellers were fascinated by the potential of the landscape to generate powerful echoes (Taylor, 2018). However, while we did find some instances of acoustic landscape appreciation, the results of the co-occurrence analysis indicate a dominance of visual appreciation of landscape over other senses our corpus. Using the co-occurrence of landscape terms and their descriptors can thus provide insights into how landscape is described in terms of auditory and visual information, and how the respective importance of these aspects may shift over time.

7.2.5 Challenges in applying natural language processing to an analysis of historic travel writing

Because we only used a small set of place names, we also manually checked the text documents to identify additional texts with place names from Loch

Lomond that were not yet contained in our lists. During this process of manual annotation of additional place names, we observed that the historic corpus contained many spelling variations, which we did not pick up automatically using the contemporary spelling of Loch Lomond place names (indicated in bold in the list below). These historic spelling variations should therefore be included in our place names list, for instance:

- Loch-Ketturrin / Loch Ketturin /Loch Catrine / Loch Katerine / **Loch Katrine**
- Loch- Venu-Char/ Lake Venachoir/ Loch Vennachar / **Loch Venachar**;
- Loch-Lomond / **Loch Lomond**;
- Callender / **Callander**;
- Trosachs / **Trossachs**;
- Loch-Archlat / **Loch Arklet**;
- Arroquhar / **Arrochar**

Even though we missed many spelling variations, a number of Loch Lomond place names were identified in the texts, which enabled us to quickly zoom into the geographically relevant text passages.

Using the annotations with our place names and landscape terms in combination with a close reading also highlights the need to expand the lists of landscape terms specifically to our corpus, which is illustrated with the following text example (blue: identified place names, green: identified landscape terms, pink: place names not identified, yellow: relevant landscape terms not contained in the list we used for searching):

> *'From this point to Loch Katrine the glen receives the name of the Trosachs. It is flanked on the right by the lofty summit of Ben-an; and Ben Yenue [sic] (2388 feet) rears its stately crest on the left. […]*
>
> *Every turn of the road unfolds fresh views of wild and romantic beauty, on which the eye reposes with new delight. The valley is one continued maze of rugged mountains, grey rocks, and green woods, lofty precipices and dark ravines, shivering cliffs and heathery knolls, with masses of trees dispersed in picturesque confusion, and, conspicuous amongst the sylvan beauties of the landscape, the light and graceful Highland birch, which, singly or in tufts, clambers up the tall precipices, and adapts itself, as no other tree has the power of doing, to the varying features of the fairy-like scene. Amidst all this amplitude and diversity of form, the eye is surprised by the ever-shifting effects of light and shade, producing all the day long a succession of novel and striking pictures'.*

(in Edinburgh & Glasgow to Stirling: Doune, Callander, Lake of Menteith, Loch Ard, Loch Achray, the Trosachs, Loch Katrine, Loch Lomond, Keddie and Gray [1873], p. 35).

Particularly, we would need to include terminology used in Victorian travel writing and landscape descriptions that include words such as 'sublime', 'picturesque', 'terrible', 'views', 'scene', 'precipices', which are used to describe landscape, which we identified as relevant during our analysis, but were not contained in our original gazetteer of landscape terms. Furthermore, we observed that some texts that had been processed using OCR contained many errors, which made it impossible for the gazetteer lookup to identify the landscape terms and place names (Table 7.3). It is possible to match in a more flexible way, or even to first normalise spellings based on methods such as edit distance, as is sometimes used in social media processing (Maynard, Bontcheva, and Augenstein, 2016), but these methods can also over-generate and should be used with caution.

These challenges notwithstanding, this exploratory analysis of Victorian travel writing aided by automated text processing shows some of the possibilities that text processing toolkits offer to transition between distant reading and close reading. It should be borne in mind that while automated language processing tools offer the possibility to process large amounts of text very quickly, thereby saving laborious human effort, nevertheless results are almost never 100% accurate, so caution should always be taken.

7.3 Reading the Trails as an Environmental Historian

One of the exercises we felt offered a useful test of the GATE analysis tool was to compare its findings with a traditional assessment of the material compiled by a close historical reading. By conducting this parallel 'forensic fishing' activity,

Optical Character Recognition Text	**Original Text**
Looking to the ndrth, a frightful preciffice df the mountain is seen, 2000 feet deep; while stretching «ftr as the eye Can l^eadb, is seen the tremendous assemblage of ruggedness that constitutes the Gramt- l^an chain.	*Looking to the north, a frightful precipice of the mountain is seen, 2000 feet deep; while stretching as far the eye can reach, is seen the tremendous assemblage of ruggedness that constitutes the Gram-pian chain.*
On the bold diib of BenTenne	*on the bold cliffs of Benvenue*

Table 7.3: Example of digitised and original text in the Guide to the romantic scenery of Loch-Lomond, Loch-Ketturin, the Trosachs, James Lumsden, (1831).

we were looking to ascertain two things: firstly, how the data from a GATE analysis might embellish, challenge and/or inform a conventional methodological/archival trawl using environmental humanities techniques, and, secondly, what might be 'missing' from a strict linguistic analysis in terms of historical context or 'buried' information hard to decode from the data alone. What follows is a short summary – from an environmental historian's perspective—of the historical value of the corpus, alongside a few reflections on how different processes of data collection and interpretation might be usefully aligned.

Firstly, it seems helpful to flag the fact that issues of place-making, landscape change and the relationship between material and imagined spaces have long occupied the attentions of environmental historians. More specifically, the construction of particular kinds of landscapes as places of unique natural value (especially in terms of how those ideal types fed historical conservation movements) has been a particular focus of scholarship, manifested, for instance, in writing on the creation of national parks. Equally, a comprehensive historiography exists on the politics of landscape and shifting attitudes towards the 'wild', aesthetics and Romanticism; the complex relationship between nature tourism, technology and modernity; and issues of empire and environmental colonialism. As such, this is the broader methodological context by which the environmental historian approaches the physical and textual landscape of Loch Lomond and the selected materials under study.

Deconstruction of the corpus of guidebooks using the techniques associated with a close historical reading ably illuminates the emergence of Loch Lomond as a visitor destination in the 1800s and highlights the importance of gazetteer literature in fostering and curating that tourist experience. *The Steam-boat Companion; and Stranger's Guide to the Western islands and Highlands of Scotland* (1820) made direct reference to the role of its genre in raising consciousness as to the glories of a trip to the Highlands. As this pamphlet noted, before the publication of Thomas Pennant's *Tour of Scotland* (1769) – the first guidebook to the region – Scotland was viewed as a 'land of barbarism and misrule', a forbidding frontier landscape that might be compared to 'wild Africa'. By the time of *The Steam-boat Companion*, however, it had been recast as a terrain of 'unusual grandeur', terrifically rather than terrifyingly wild and 'capable of fascinating the most indifferent observer, and rousing his profound admiration'.

Tracing an empirical trail using our corpus of guidebooks, we can sequentially plot the historical construction of Scotland as a rugged paradise and, in the process, interrogate the findings of the GATE data analysis above. Read as a collective, these precursory *Lonely Planet* guides provide a ready inventory of historical detail as to what the aspiring tourist should see and how to get there. As such, the textual path set out in these guides gives a clear sense of the emergence of a set of key landmarks that each traveller had to 'tick off' on their expeditions. The repetition of these places in successive texts (as well as the recitation of their distinct qualities) established a core list of 'must-do' visits

that communicated a clear landscape perception of the region's scenic qualities. Elevated in these guides, then, are an inventory of aesthetic treasures, Loch Lomond (and Ben Lomond), Lochs Ness and Katrine, the Falls of Clyde, the Trossachs, Skye and Glencoe, all of which were installed as iconic spaces of nature tourism. Performing a conventional historical reading alongside GATE analysis allows for a valuable charting, comparison and mapping of this emerging literary geography.

The Loch Lomond vacation experience was not entirely a case of 'roughing it' however. Embedded in the guidebooks is a sense of a gathering infrastructure of tourist provision – information on inns, roads, steamships and hotels to ease the visitor's journey. This 'hidden' context would be hard to extract from data mining alone. Also implicit in the historical record is a cogent route map with a defined choreography to it, a directed movement from one site to the next. *Nelson's Tourist Guide* (1858) pointed out that the pathways of travel were of major import, that one should operate 'upon the principle that it is more pleasing to be led from soft and tame to magnificent and sublime than the reverse'. Aesthetics dictated the trails to be followed: another subtlety laid bare by a qualitative reading. *The picture of Glasgow, and strangers' guide* (1818) by R. Chapman advised the guidebook should be a necessary 'companion' to take on any excursion.

Where the GATE analysis is especially useful is in providing a data set to consider alongside a historical textual-crunch of guidebook landscape descriptors. The guides certainly spent a lot of time detailing the scenic delights of the Scottish Highlands as a place of wildness, antiquity and unique quality. Writers commonly referenced its rugged and mysterious qualities, and especially its keenly felt connection with the Romantic ideal and untended views that inspired contemplation, awe and a dose of terror. Descriptions abounded of glorious lakes and mountains, short offerings on flora and fauna, geology and hydrology, all wrapped up in a textual veneer of wild charm. The view from the top of Ben Lomond was frequently situated as a supreme site of wilderness pilgrimage, to *Shearer's Guide to Stirling, Dunblane, Callender, the Trossachs and Loch Lomond* (1895), a 'noble panorama'. *Nelson's Tourist Guide* (1858) reminded tourists that the climb really was not that hard. Common to these descriptions was a sense of remoteness, emptiness and solitude. What GATE adds to a historical reading of such passages is the opportunity to formally catalogue, delving (as we did above) into the text to see the relative use of terms such as 'beautiful,' 'picturesque' or 'sublime.' Sometimes a traditional reading of guidebook content mitigates against this through a preference for sweeping prose. As Chapman commented, Loch Lomond and its environs possessed '**almost every requisite** [emphasis added] to exalt the imagination, to engage the attention, to sweeten peace, and to furnish amusement to solitude'.

As successive guidebooks built on one and another to construct a Highlands nature resort for well-to-do English visitors, scattered notations showed the

other contributing factors abetting the process. Royal patronage was one factor – Queen Victoria having first visited in 1842 and Balmoral purchased in 1852. *Shearer's Guide* reprinted an account of a royal visit in 1869 in full. More significant (and, indeed, a factor in the Queen's attachment) was the raft of literary figures writing rapturously of Highlands landscape, in particular Sir Walter Scott and his famous 1810 *Lady of the Lake* epic poem (referenced and reproduced in many guides including *Shearer's* and *Nelsons* and which sold 25,000 copies in its first six months of publication). The importance of royal or literary patrons created a sense of 'value' to the nature collections on display, but not one easily quantified. What is, however, more easily traceable is the gathering repetition of phrases associated with Scott, for example, or of oft-repeated phrases attributed to Loch Lomond that conferred on it an identity as a lake famed for its 'fish without fins, waves without wind, and a floating island' (referenced in *Edinburgh & Glasgow to Stirling: Doune, Callander, Lake of Menteith, Loch Ard, Loch Achray, the Trosachs, Loch Katrine, Loch Lomond, Keddie and Gray* [1873]).

Contained in the guides are frequent comparisons, either to the pastoral lines of the English countryside; or to 'blue-chip' nature sites elsewhere in the world. A common theme in both was the supposition that Scotland (and particularly the Highlands) denoted a space apart, an unmediated slice of primeval rugged land that had escaped the transformations of industrialism. *A Journey to the Western Isles of Scotland* (1775) by Samuel Johnson, pointed out that this 'unknown and untravelled wilderness' inspired sensations very different from those of the 'artificial solitude of [English] parks and gardens' in nurturing a haunted sense of 'want and misery, and danger'. Here, a historical reading can provide useful contextual reference points in thinking through the parallel histories of designed landscapes elsewhere. In *The Guide to the romantic scenery of Loch-Lomond, Loch-Ketturin, the Trosachs* (1831) James Lumsden encapsulated an important relationship between scenic landscapes and cultural nationalism in ranking Loch Lomond as the best lake in Great Britain and superior to Lakes Geneva and Constance for 'wild magnificence and solemn grandeur'. Joined to the heroic mantle of raw nature was a sense of ancientness – antiquity commonly depicted in the form of old castles and cathedrals. Lumsden noted that visitors scanned the scenery with 'anxious eye' searching 'for the haunts of those whom history has chronicled'. Here the environmental historian can make a valuable intervention in exploring the tenuous threads connecting landscape, people and constructions of identity. Embedded in the text, too, was a definite sense of the imperial gaze – often expressed in the presentation of Highlander culture as warlike, lawless and primitive. Samuel Johnson talked of communities in possession of a 'savage wildness' and (importantly) made reference to the political dynamics behind the creation of a tourist landscape in the form of the Highland Clearances.

7.4 Concluding Thoughts

To the environmental historian, these guidebooks show a tourist landscape under construction, one that crafted a consistent narrative of celebrating the wild and the romantic, and communicated that via a recurring phraseology and a clear choreography of the visitor experience based on visual markers. Text analysis with GATE throws up new and provocative possibilities in analysing this material by allowing us to identify sections of texts with relevant landscape descriptions; to map a literary landscape more forensically and to compare different authors over time, for example, by comparing enumerations of different terminologies used; and by quantitatively cataloguing the use of terms such as 'beautiful' and 'picturesque', which have frequently been discussed in landscape history.

There remain a few caveats to this approach. The first of these involves the issue of concealed messages buried deep in the text, as well as the value of illustrations, appendices and supplementary material which an automated text mining approach fails to capture. By the time of the *Shearer's Guide*, a raft of companies catered to the every whim of visiting tourists – in the appendix, a wealth of adverts can be found touting steamboats, outfitters, bookshops and hotels and 'hydropathic spas' – and illuminated the networks of industrialism beneath the lakes and mountains. These glimpses are important, hints as to the hidden stories behind the text and the importance of reading *absence* as well as presence in the narrative tracks of elite tourism in the Scottish Highlands. Significant here is what a strictly defined linguistic analysis does not communicate: namely the broad context of political processes of land seizure as well as the voices of historical actors – Highlanders, women, local tour guides – who scarcely appeared in the scripted trails of gazetteer literature.

That said, by highlighting the possibilities of 'forensic fishing' in practice, this chapter usefully illustrates the way in which text processing and historical methods can work together to construct an innovative and blended approach to environmental questions of landscape and place-making. Answering such questions is relevant for landscape research that seeks to look at landscape not as a snapshot in time, but taking into account a historical perspective of landscapes as dynamic and ever-changing. Landscape research seeks to understand people–place relations, and while much of the focus is on contemporary relations of people and places, integrating historical information on how people perceived, interacted with and described landscapes of the past helps to improve our understanding of how these relations have changed and develop to the present, and to shed light into how they may be evolving in the future.

Furthermore, studying historic relations between people and landscapes is not only relevant from a landscape research perspective, but may also inform contemporary policy-making. For example, policies that seek to restore landscape to some historical point in time (such as certain rewilding or landscape

conservation initiatives) may be challenged by notions of landscape found in these historic guidebooks that highlight the historically rooted and manifold relations between people and places that they visited and inhabited.

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