

The State of Forest in the Western Himalayas (1783-1855) through Analysis of Itineraries

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Abstract

This article aims to elucidate the state of forest in the Western Himalayas between 1783 and 1855 through analysis of itineraries written about the region, and shows the result on the map using GIS (Geographic Information System) method. The paper first investigates seventeen itineraries and picks up wordings the authors used to describe the forest condition. After classifying those wordings into five categories i.e. 'rich forest and also nowadays rich forest', 'poor forest or barren and also nowadays poor or barren', 'rich forest but nowadays poor or barren', 'poor forest or barren but nowadays rich forest', 'already deforested', the paper identifies locations of each description by using 'Google Maps'¹ then makes the final map by using 'QGIS Desktop'² software. Based on the final map that consequently depicts the state of the forest during the period, the paper finally discusses its implication. The study results indicate that there was no distinct deforestation in the Western Himalayas before 1855 at least within the areas the authors visited.

Keywords

forest, Western Himalayas, before British rule, itinerary, GIS

Introduction

One of the major aims of the study the writer of this article puts focus on is how the forest policies under British rule functioned the forest conservation in the Western Himalayas. More directly, whether or not, or to what extent were Indian forests destroyed or affected by British rule. To get clues to answer these questions, the exact knowledge about the state of the forest not only during but also before British rule is needed. However, while there are many documents concerning the former, the number of those about the latter is very limited. At this point, some itineraries written before British rule seems to provide relevant information (as the complementary documents) because they referred to the forest situation during the time.

Needless to say, careful selection of itineraries is also necessary. Among the Western Himalayas, areas to the south of the Satluj were annexed to British authority³ after Gurkha war (1814-16), to the north of the Satluj, practically after second Sikh war (1848-49). A memorandum to implement a comprehensive forest policy is issued by Governor-General Dalhousie in 1855. This paper, therefore adopts 17 itineraries before 1855 (travelling year) which contain descriptions relating to the forest of the Western Himalayas for the purpose of showing the state of forest before British forest policies were introduced by analysing the descriptions of the itineraries.

In order to make it clearly visible on the map, both GIS method of G-map and Qgis are used.

1.Previous Studies

There are a vast number of travel literatures that trace footprints of historically prominent figures in India

like Alexander the Great, Xuanzang, Alberuni, Marco Polo, Ibn Battuta, Babur and so on. For example, Aurel Stein's Alexander [Stein 1929], Shinjou Mizutani's Xuanzang [Xuanzan 1971], Sachau's Alberuni [Alberuni 1989], Henry Yule's Marco Polo [Yule 1903], H.A.R. Gibb's Ibn Battuta [Battuta 1986] and Annette Susannah Beveridge's Babur [Babur 1979]. Besides, there are lots of works annotating travel journals on India⁴. Although the authors or translators of those previous studies endeavoured to identify the location of the place each personage visited, none of them analysed itineraries relating to the Western Himalayas with the same purpose or the same method as this paper's.

2. Selection of Itineraries

This writer collected 47 documents⁵ which included paper-based books, internet sources, copies of the original ones archived at libraries. Out of those documents, 17 contained descriptions that had something to do with the forest or tree in the Western Himalayas.

2.1 List of Itineraries

A list of selected itineraries is as follows. The figure put in bracket [] at the end of each itinerary shows the first year when the author began travelling. The list is lined up in ascending order of the figure.

Forster, George, 1798, *A Journey from Bengal to England through the Northern Part of India, Kashmere, Afghanistan, and Persia, and into Russia, by the Caspian-sea* Vol. I, R. Faulder, London [1783]

Gerard, Alexander, 1841a, Journal of a Survey from Soobathoo to Rarung, 1817, *Account of Koonawur, in the Himalaya by the Late Capt. Alexander Gerard Edited by George Lloyd*, James Madden & Co., London [1817]

Gerard, Alexander, 1841b, Narrative of the Journey in 1818, *Account of Koonawur, in the Himalaya by the Late Capt. Alexander, Gerard Edited by George Lloyd*, James Madden & Co., London [1818]

Hearsey, Major (ed.), 1835, Mr. Moorcroft's Journey to Balkh and Bokhara, Journal of Gholaum Hyder Khan, *The Asiatic Journal and Monthly Register* Vol. XVIII, [1819]

Moorcroft, W and Trebeck, G, 1989(1st. 1841), *Travels in the Himalayan Provinces of Hindustan and the Panjab* Vol. I, Asian Educational Services, New Delhi [1819]

Lloyd, George (ed.), 1840, *Narrative of a Journey from Caunpoor to the Boorendo Pass in the Himalaya Mountains, via Gwalior, Agra, Delhi, and Sirhind by Major Sir William Lloyd and Captain Alexander Gerard's Account of an Attempt to Penetrate by Bekhur to Garoo, and the Lake Manasarowara* Vol. I, J. Madden & Co., London [1821]

do. Vol. II

Mundy, C, 1832, *Pen and Pencil Sketches, Being the Journal of a Tour in India* Vol. I, John Murray, London [1827]

Archer, Major, 1833, *Tours in Upper India and in Parts of the Himalaya Mountains; with Accounts of the Courts of the Native Princes, &c.*, Richard Bentley, London [1827]

Vigne, G. T., 1842, *Travels in Kashmir, Ladak, Iskardo, the Countries Adjoining the Mountain-Course of the Indus, and the Himalaya, North of the Panjab* Vol. I, Henry Colburn, London [1833]

Hügel, Charles, 1836, Notice of a Visit to the Himmaleh Mountains and the Valley of Kashmir, in 1835, *The Journal of the Royal Geographical Society of London* Vol. 6 [1835]

Hügel, Charles, 1845, *Travels in Kashmir and the Panjab Containing a Particular Account of the Government and Character of the Sikhs*, John Petheram, London [1835]

Markham, Fred, 1854, *Shooting in the Himalayas. A Journal of Sporting Adventures and Travel in Chinese Tartary, Ladac, Tibet, Cashmere, &c*, Richard Bentley, London [1846]

Thomson, T, 1978(1st. 1852), *Western Himalaya and Tibet: A Narrative of a Journey through the Mountains of Northern India, during the Years, 1847-8*, Cosmo Publications, New Delhi [1847]

Hervey, Mrs., 1853, *The Adventures of a Lady in Tartary, Thibet, China, & Kashmir; Through Portions of Territory Never before Visited by European. with an Account of the Journey from the Punjab to Bombay Overland* Vol. I, Hope and Co., London [1850]

do. Vol. II [1851]

do. Vol. III[1851]

2.2 Synopsis of each Itinerary

Forster travelled around in wide area [Forster 1798]. With regard to the parts targeted by this paper, he traced the routes including Haridwar⁶, Nahan, Bilaspur, Nadaun and Nurpur. He recorded date, distance, landscape and many forest descriptions which reports that the regions had bountiful forests before Bilaspur. However, it is difficult to precisely locate them on the map today.

[Gerard 1841a] is a document in the form of appendix of a Kinnaur chorography. This is supposedly one of the oldest travel journals which contain a lot of exactly scientific descriptions of the forest situation in the Western Himalayas. He was captain of Bengal Army and took part in various surveys, that is, geological, topographical and geographical ones⁷. We can see his prominent skills in those fields in his journals. According to [Gerard 1841a], he travelled from Subathu and returned to Subathu, via Shimla, Narkand, Hattu, Kotgarh, Rampur, Sarahan (Shimla dist.), Wangtu, Rarang, (turned back here), Wangtu, Shathal pass (31.399619 lon. 77.974747 lat., 4650m high⁸), Chirgaon, Rohru, Kui, Reolo (unknown), Kotgarh, Kumarsain, Kangal, Pandoa, Khaira, Suni, Tatapani, Nehra, Arki. He traced obviously rare routes such as between Wangtu and Chirgaon via Shathal pass, Rohru, Kotgarh and Arki. It is supposed that this is because one of the purposes of his travel was to survey wider areas. He gave magnificent descriptions of the forests, trees (though with no scientific names) and plants. Moreover, he described not only about topography and geology but also more in detail about precise distance, time, temperature, altitude and so on. In short, his descriptions are very trustworthy.

[Gerard 1841b] is also an appendix to the same chorography as above. He made a journey from Subathu to Shimla, via Shimla, Parala, Kotkhai, Deori pass, Rohru, Janglik, Buran pass (31.386921 lon. 78.145958 lat., 4560m high⁹), Barua, Powari, Rispa, Moorang, Nesang, Dubling, Namgia, Shipki pass, Chinese territory, (turned back here), Namgia, Spiti, Ladakh, (turned back here), Sunnam, Lubrung (unknown), Runang pass, Lippa, Jangi, Akpa, Pangi, Roghi, Meeru, Chegaon, Tranda, Nichar, Sarahan (Shimla dist.), Dhar, Rampur, Nirath, Kotgarh, Matiana. In this tour, he took a unique route such as Sunnam, Runang pass and Lippa. This book is assumed one of the oldest European's records about Spiti and Ladakh.

Gholaum Hyder Khan travelled in the Himalayas [Hearsey 1835] accompanying Moorcroft and Trebeck (see next itinerary). He visited Almora, Joshimath, Badrinath, Srinagar (Garhwal dist.),

Dehradun, Nahan, Ramgarh, Pinjore, Nalagarh, Bilaspur, Sundernagar (from here, went to Lahore for passport), Nadaun, Jawala Mukhi, Amb, Nadaun, Sujampur Tirra, Gumma, Kamand, Bajaura, Sultanpur, Naggar, Rohtang pass, Khoksar, Ladakh and Kashmir. Two out of eight descriptions, which are adopted for this paper from the journal were written by Hearsey, editor of the journal.

Moorcroft or Trebeck or together traced vast areas in the Himalayas [Moorcroft and Trebeck 1989]. They started in Garhwal Himalayas, and then travelled from one place to another, Dehradun, Nahan, Pinjore, Nalagarh, Malaun, Bilaspur, Dehar, Sukhet, Hamirpur, Jwala Mukhi, Nadaun, Amb, Sujampur Tira, Bija Pur, Ambal Tappa, Chadiari Darug, Baijnath, Mandi, Harabhag, Gumma, Silahswar, Putakhal, Holu, Drang, Tilakpur pass (unknown), Sultanpur (Kullu dist.), Manikaran, Jagatsukh, Aleo, Goshal, Bashist, Rohtang pass (3979m), Khoksar, Ladakh. The underlined places were truly unique. Indeed, it is assumed that they are the first Europeans who have published the account of Kullu valley and have got through Rohtang pass. Moorcroft was a surgeon and employed as superintendent of military stud of the East India Company [Moorcroft and Trebeck 1989:xxi]. Although, he had enough knowledge about botany, he had little interests in forests or trees. As a result, it is difficult to get relevant information of the forests at that time from this literature.

According to the book [Lloyd Vol. I 1840], William Lloyd travelled in the Himalayas via Rupnagar, Nalagarh, Malaun, Bilaspur, Rajpura (Himachal Pradesh), Rupnagar, Pinjore, Subathu, Syri, Shimla, Jakhu, Mahasu (now Kufri), Fagu, Matiana, Narkanda, Hattu, Kotgarh, Duttanagar, Rampur, Gaura, Manjhgaon, Sarahan (Shimla dist., turned back here), Kotgarh, Nun, Sheyal (unknown), Chanbi peak, Tikkar, Kashani, Chirgaon, Janglik, Litham, Buran pass (turned back here) and Pinjore. He was a Captain of the East Indian Company's army¹⁰. He has sufficient knowledge of botany and regularly recorded the forest conditions. This itinerary contains precise descriptions of landscape, botany, agriculture and so on in addition to a basic data of distance (always), temperature and altitude (properly).

Mundy took a journey in the Himalayas from Haridwar, visiting Kansrao, Dehradun, Mussoorie, Landour, Khalanga, Palion, Fatehpur, Rampur Ghat (on the Yamuna river), Nahan, Banethi (Sirmaur dist.), Sarahan (Sirmaur dist.), Subathu, Shimla, Mahasu (now Kufri), Fagu, Kotkhai, Jubbal, Rohru, Ghirgaon, Roole (unknown), Shathal pass (turned back here), Karasa, Kashani, Tikkar, Hattu, Kotgarh, Narkand and Shimla. He also had so much knowledge of botany that he described the situations of many forests.

Archer travelled wide areas in the Himalayas [Archer 1833] such as Haridwar, Subathu, Shimla, Narkand, Kumarsain, Dalash, Shamshar, Jalori pass, Barnagi, Bishleo pass, Sarahan (Kullu dist.), Nirmand, Rampur, Deothi, Muttyne (unknown), Chhalawat, Byunthai, Hattu, Sainj, Nagnee (unknown), Jubbal, Rohru, Chirgaon, Janglik, Buran pass. In his journey he chose unique routes such as Barnagi, Bishleo pass, Sarahan (Kullu dist.), Nirmand, Muttyne (unknown), Chhalawat and Byunthai. He had not merely a good surveying skill like using a barometer, but also knowledge of botany and geology. Therefore, it is fair to say that his description is trustworthy.

Vigne traced a route in the Western Himalayas [Vigne 1842] including Pinjore, Sabathu, Shimla, Churdhar, Mussoorie, Dehradun, Haridwar (after that he temporarily went to the plain area), Rupnagar, Kiratpur Sahib, Khundalu (unknown, around 31.282112 lon., 76.350755 lat.), Malaun, Bilaspur,

Sundarnagar, Mandi, Kamlahgarh, Sujampur Tira, Nadaun, Jawala Mukhi, Kangra, Haripur, Jawali, Nurpur, Chowari, Dainkund Peak, Basohli and Chamba. The underlined places were unique ones only he visited. He had a lot of knowledge of plants as well as geology, and recorded many plants with scientific names of each.

Hügel travelled in the Western Himalayas [Hügel 1836] calling at Bilaspur, Nurpur, Chamba, Surangani, Gatha, Doda to Kashmir.

He also visited Mussoorie, Shimla, Bilaspur, Dakri, Ghumarwin, Mair, Hamirpur, Khagal, Jalari, Nadaun, Jawala Mukhi, Haripur, Katholi, Jawali, Nurpur, Pathankot, Jammu and Kashmir [Hügel 1845]. He had much knowledge of botany.

Thomson made a broad and careful survey of the following areas in the Western Himalayas [Thomson 1978] including Kalka, Kasauli, Subathu, Haripur (Solan dist.), Syri, Shimla, Jakhu, Mahasu (now Kufri), Fagu, Teog, Matiana, Narkanda, Hattu, Kotgarh, Rampur, Gaura, Sarahan (Shimla dist.), Tranda, Nichar, Wangtu, Chagaon, Meeru, Kalpa, Lipa, Spiti, Ladakh, Kashmir and Jammu. His enormous academic knowledge of botany enabled him to list up various sort of the trees with scientific names. Furthermore, he tried to explain the reasons why the density of forest differed depending on location. That is very persuasive. Hence, a maximum number of descriptions regarding forest condition are collected from this book.

Markham made a journey in vast areas of the Himalayas [Markham 1854]. As the title of his literature indicates, his interest was mainly in shooting games. Unsurprisingly, little description of the forests was found in his book. Despite that, this itinerary is adopted for this research simply because it touched upon Kullu forest, which, the writer of this paper pays an attention to in terms of forest conservancy [Yoshizumi 2012].

Hervey was the only female author in this research and at the same time, the first European woman who travelled around in vast territory of the Himalayas including up to high mountain passes and most remote mountainous regions. She entered the Himalayas from Hoshiarpur [Hervey 1853 Vol. I] and visited a considerable number of places as follows. Amb, Nari, Jawala Mukhi, Bhawarna, Paprola, Sukabag, Harabhadg, Drang, Mandi, Kamand, Bajaura, Sultanpur (Kullu dist.), Naggar, Jagatsukh, Burwa, Marhi (turned back here), Chong (wounded seriously), Seobagh, Pini, Manikaran (turned back here), Rohtang pass, Khoksar, Ghondhla, Seraj, Kinnaul, Spiti, Ladakh (turned back here), Langera, Pringul, Manjir, Chamba, Chowari, Kasba Raipur, Tundi Khas, Hatli, Rihlu Khas, Paror Khas, Paprola (again), Drang (again), Chong (again), Manikaran (again), Naggar (again, turned back here), Larji, Palach, Rishala, Jalori pass, Shamshar, Dalash, Kumarsain, Narkanda, Hattu, Matiana, Fagu, Mahasu (now Kufri), Shimla, Sayri, Haripur (Solan dist.), Khadli, Baddi, Rupnagar. She went out from the Himalayan region to the plain areas. The underlined places above were unique ones nobody except Hervey had visited before. She wrote down the name of the place, date and distance every day. As she had not so much knowledge of botany, the accuracy of her descriptions about plant might be somehow doubtful, which does not matter, because the aim of this paper is to investigate whether or not the forest is rich or poor at that time.

In the following year, Hervey travelled [Hervey 1853 Vol. II] in the Western Himalayas, namely

Amb, Jawala Mukhi, Kangra, Dharamshala, Shahpur, Nurpur. Afterward she went inland to most mountainous areas such as Baltistan and Ladakh via Jammu and Kashmir. For this reason, this volume is very interesting, though the areas unfortunately are out-of-range of this research.

According to [Hervey 1853 Vol. III], she continued journey via Ladakh, Spiti¹¹ and came to the forest areas again later, calling at Chango, Leo, Hango, Hangrang pass, Sunnam, Runang Pass, Kanam, Lippa, Werang Pass (unknown), Gyangra, Kashang, Pangi, Powari, Barua Khas (turned back here), Kilba, Jani, Nichar, Tranda, Sarahan (Shimla dist.), Rampur, Shimla, Jatog and Kalka.

3 Identification of the Location Each Description Referred to

3.1 General Issues

A different author used a different name for the same place, for instance, Koteghur, Kotgurh, Khotghur, Khotgur, Kotgarh were used for the place ‘Kotgarh’. This might happen for some reasons. For one thing, their journeys were carried out before an English name was given to each place. In general, an official place name is determined after the area is annexed to British domain and the name is written in an official document. Another reason is that some authors presumably wrote down a place name as they had heard from local people or guide who could not write English. Other authors spelled place names differently from nowadays, e.g. Sookhait [now Sundarnagar]. In most cases, the place name in itself was changed.

The problem is that it is extremely difficult to determine as to whether or not a certain word in the literature is a place name when its author used the word starting with a capital letter like ‘Boulee’. In order to resolve the issues, this paper uses old maps¹², old dictionary of Indian place names¹³, and Anglo-Indian dictionary¹⁴.

3.2 Utilising G-map

This paper utilises G-map to identify the location corresponding to each of chosen description from the itineraries. One of the major advantages of utilising G-map is its convenience especially in the following points.

- 1)The GCS (Geographic Coordinate System) data (i.e. longitude and latitude) can be obtained by one click on G-map.
- 2)It is easy to determine the topography and altitude of the location by using ‘terrine’ layer.
- 3)It is easy to measure the distance by using ‘measure distance’ command. It is useful if the author gives detailed distances.

Some disadvantages of G-map should be pointed out. Since a village name on G-map is put in the centre of the administrative territory, it does not accord with the location of a real village. Therefore, it is required to consult a satellite version of G-map so as to identify the correct location of the village the author visited, especially in case that it is necessary to identify its location or route drawing upon a description of distance s/he wrote in the itinerary (see Figure 1).

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Figure 1. Sample of Village Name and its Real Location

In most cases, G-map gives relatively correct place names to a village or a place this paper puts focus on. Regarding small rivers, tributaries, mountains and mountain ranges, however, G-map provides a few names, if any. Even if it could, the name is not necessarily correct. For example, a name of a tributary is likely to be the same as that of the main stream. In this case, the old maps mentioned above are used in order to identify the location depending on each author's description of the place such as the rivers or hills.

4 Identification of the Route

4.1 Which Road

The road followed by the author is different from those of nowadays in many cases. If old roads remain on the old map, it is possible to identify the presumed route on G-map (see Figure 2¹⁵). Sometimes an old road can be found on the G-map's satellite version of the detail mode. On the other hand, an old road cannot be found on the old map or G-map, what could be done to identify its location is to analyse the author's statement referring to topography, an object and its azimuth, ups and downs in the roads, altitude and so on.



Figure 2. Sample of Presumed Route from [Gerard 1841a]

4.2 Distance

If the author describes the distance from one point to the other, it is comparatively easy to identify both the course s/he traced (see Figure 2) and its location, because the distance can be measured on G-map without difficulty (mentioned above). In some itineraries, however, the total distance of a day does not match the sum of each distance between one point and the next one. Some authors use various units of distance simultaneously such as mile, feet, yard, furlong, kos [Indian unit]. In these cases, much more time is needed to identify the course.

5 Source Criticism

This paper aims to analyse the descriptions relating to the state of forest in itineraries. Descriptions like “beautiful forest” or “gloomy forest”, which seemingly include the author’s sentiment, therefore, inevitably requires source criticism. Regarding source criticism, this paper took into consideration of the following points.

- 1) Authors of itineraries are inclined to be more attracted by a rich forest than a poor one.
- 2) If an author is interested in a particular tree, s/he is inclined to describe a forest which contains that tree more frequently than the other ones. For example, Hügel has much interest in fruit trees [Hügel 1845].
- 3) If an author is not so much interested in a forest, s/he is apt to mention it less and less than before, although s/he might write about it many times at the beginning of his/her journey. For example, Hervey refers to forests many times in Vol. I [Hervey 1853], while she mentions them a few times in Vol. II and Vol. III despite she might have travelled through a lot of forest areas.
- 4) Descriptions of the author who has surveying skills on top of an abundant knowledge of botany and trees can be said to be reliable. For example, Gerard [Lloyd 1840 Vol. II, Gerard 1841a, Gerard 1841b]. Another example Thomson [Thomson 1978] who makes a great contribution to this paper as he records a considerable numbers of forest descriptions owing to his affluent knowledge of botany.
- 5) If an author is more interested in something else than forests, it would be likely that his/her forest description is prone to be obscure and/or incorrect. For instance, since Vigne has much interest in geology, stone and mine, he gives a thorough description of them. On the other hand, his simple description of forests gives few clues to identify the location [Vigne 1842].
- 6) The situation of the forest might be imagined from the descriptions of some other things, not from the forest. For example, Mundy writes a lot about hunting elephants or tigers in his itinerary [Mundy 1832]. Judging from this statement, it is assumed that there is a rich forest around the place.

6 Mapping

6.1 Some Issues in Mapping

A tremendous number of forest descriptions were picked out from the 17 itineraries for this research. Nevertheless, most of them needed to be removed from a targeted list for mapping (see Table 2 and Appendix I) because it was impossible to identify the location corresponding to each of them. Followings are those examples. “The country for the most part ...”, “Between the plains and here ...”, “The greater part of the road ...”, “The hill about the latter portion of this march ...” and so on. On the other hand, in the case that the location are not clearly specified, the most probable location is adopted. For example, in

the descriptions as “At the upper part of the valley we forded ...”, “On the southern slope of the ridge ...”, the writer of this paper determined the location at the centre of the field that might presumably come in the sight of the author.

6.2 Utilising GIS Method

One of the aims of this paper is to illustrate the states of forests on the map using GIS methods, based on the analysis of the descriptions picked out from the itineraries. To this end, it is necessary to utilize colour symbols on the map. More precisely, symbols used for a layer of each itinerary on a completed map should be different, depending on the forest condition.

In this paper, forest condition is classified into the following five categories;

- 1) ‘rich forest and also nowadays rich’
- 2) ‘poor forest or barren and also nowadays poor or barren’
- 3) ‘rich forest but nowadays poor or barren’
- 4) ‘poor forest or barren but nowadays rich forest’
- 5) ‘already deforested’.

As a result, the shape of each symbol on the map represents itinerary, whilst its colour represents the forest condition.

One problem in using the G-map system in this way, however, is that the number of the layer available in the system is less than eleven, which is smaller than the total number of itineraries adopted for this research. Moreover, there is a limit to the number of applicable colours of the symbols. Therefore, this paper adopted Qgis software for the final mapping.

6.3 Preparing CSV Files

CSV files containing GCS data are necessary for the mapping on Qgis. This paper adopts the CSV file structure shown below;

- 1) id: integer
- 2) longitude: real number
- 3) latitude: real number
- 4) comment: text (containing the page number of description and the short note of the forest condition)
- 5) flag: integer (showing the classification according to the forest condition mentioned in section 6.2).

The first procedure to prepare for CSV files according to each itinerary is to make a spreadsheet table (see Table 1). That is followed by transforming the sheet to a CSV file.

Table 1. Sample Spreadsheet Table from [Gerard 1841a]

id	longi	lati	comment	flag
1	77.046	31.074	p.197 Syree [Sairi] through oak and boorans ; through cheer and keloo trees	3
2	77.179	31.107	p.197-8 through keloo and oak trees with very thick underwood	3
3	77.182	31.108	p.198 first five furlongs through oaks	1
4	77.206	31.111	p.199 covered with oaks on the north face and	1

6.4 Mapping on Qgis

The mapping procedure to use Qgis of version 2.18.22 is as follows.

- 1) To download Quick Map Services Plugin to utilise G-map on Qgis
- 2) To incorporate G-map (‘terrain hybrid’ version and ‘satellite hybrid’ version) into Qgis
- 3) To import all CSV files using ‘add delimited text layer’ command
- 4) To set colour and shape of each symbol according to the itinerary and classification of forest condition using ‘layer properties’ → ‘style’ command.

Figure 3 is a sample of mapping from [Gerard 1841a] and [Thomson 1978]. Both travelled in the southern part of the Satluj river. As this figure could not be expressed in colour, G-map (satellite version) of 50% transparency is employed for a map layer in order to make its symbols stand out. Label number accords to the forest condition mentioned in section 6.2. Tent shape is Gerard’s symbol and tree shape is Thomson’s one.

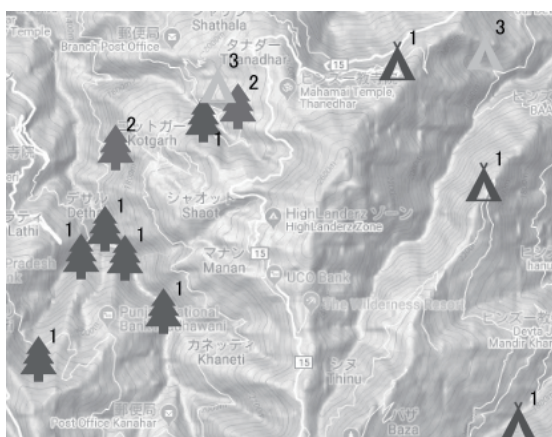


Figure 3. Mapping Sample of Qgis

7 Results

7.1 As a Whole

Total mapping number is 314. Table 2 shows the mapping number of each itinerary, and listed in descending order. Number of each classified forest condition is shown on Table 3.

The area which has many mapping points is as follows¹⁶.

- a) Between Shimla and Fagu
- b) Between Narkand and Kotgarh
- c) Between Rampur and Wangtu
- d) Between Kalpa and Pangi
- e) Between Kalka and Kasauli
- f) Kullu valley
- g) Dun valley
- h) Around Joginder Nagar.

Out of these, from a) to e) are situated along the main route from plain to Tibet through the Himalayas. Therefore, many traveller traced this route.

7.2 The Area Which Has Higher Ratio of each Category of the State of Forest

7.2.1 The area which has higher ratio of ‘rich forest and nowadays rich’ is as follows.

- Around Jakhu peak (just east of Shimla)
- Around Mahasu peak (Kufri)
- Around Narkand and Hattu peak
- Between Rampur and Nichar along the old road
- Between Kalpa and Pangri along the old road
- Kullu valley
- Dun valley
- Around Joginder Nagar.

7.2.2 The area which has higher ratio of ‘poor forest or barren and also nowadays poor or barren’ is as follows.

- Southern slopes of the mountain ranges between Kufri and Narkand
- Mountain slopes along the right bank of the Satluj river between Nogli and Rampur
- Mountain slopes and road side along the bank of the Satluj between Nichar and Kalpa
- Around Kalka and mountain area in the northeast of Kalka.

7.2.3 The area which has higher ratio of ‘rich forest but nowadays poor or barren’

- Around Pinjore
- Southern slope of mountain range between Baghi and Hadyala (77.654542 lon.¹⁷ 31.265534 lat.¹⁸)
- Southern slopes of mountain ranges along right bank of the Satluj between Nichar and Kalpa
- Mountain slopes along right bank of the Pabbar river between Chirgaon and Janglik
- Mountain slopes of Sangla valley
- Kangra valley between Palanpur and Macleodganj.

7.2.4 The area of ‘poor forest or barren but nowadays rich forest’

Mapping point of this category is only one and it is on the mountain slope in the east of Rampur.

7.2.5 The area of ‘already deforested’

Mapping points of this category are only four.

- Just south of Dehradun

Table 2. Mapping Number of each Itinerary

Source	Mapping number
Thomson 1978	90
Gerard 1841a	70
Lloyd 1840 Vol. I	32
Mundy 1832	26
Hervey 1853 Vol. I	23
Archer 1833	20
Hervey 1853 Vol. III	9
Hearsey 1835	8
Gerard 1841b	8
Moorcroft 1989	7
Vigne 1842	7
Lloyd 1840 Vol. II	4
Hügel 1845	4
Forster 1798	2
Hervey 1853 Vol. II	2
Hügel 1836	1
Markham 1854	1

Table 3. Number of each Classified Forest Condition

Category of forest condition	Mapping number
rich forest and also nowadays rich	195
poor forest or barren and also nowadays poor or barren	66
rich forest but nowadays poor or barren	48
poor forest or barren but nowadays rich forest	1
already deforested	4

- b) Shimla (in or just out of the urban area)
- c) Mahasu (now Kufri)
- d) Between Mahasu (now Kufri) and Fagu.

7.3 Examples of the Description¹⁹ according to each Category of the Forest Condition

7.3.1 ‘Rich forest and also nowadays rich’

- 1) On the 26th [Feb, 1783]²⁰, arrived at the village of Khalsawala [now Kaluwala? about 16 km to the south east from Dehradun]—seven cosses [1.66 mile [Yule 1996:261]]. The kasilah [caravan] halted this day on a pleasant green plain adjoining to the village, and skirted by a wood... I stayed into the thickest part of the wood... [oldest mapping point in this research, identified as 78.15733 lon, 30.21813 lat.] [Forster 1798:197]
- 2) Jukkoo [now Jakhoo, about 1.5km to the east from Shimla] is mantled with hoary cedars, oaks clustered with acorns, and Rhododendron-trees blushing with bloom. [some other authors mentioned this place, 77.18354 lon. 31.1006 lat.] [Lloyd 1840 Vol. I:145]
- 3) [from Jakhoo to Kufri] From thence the road for one mile was upon the top of the Dhar [ridge], the first half-mile good and level, and the latter part a steep ascent upon soil with oaks to the left and Keloos (*P. excelsa*) to the right. Then for two miles the Suruk [made road] was fine and plain, upon a left-hand Dhar covered with a very thick forest of Deodars (*Cedrus Deodara*). [some other authors mentioned this place, 77.23431 lon. 31.12118 lat.] [Gerard 1841a:199]
- 4) The ridge of Nackandeh [now Narkand] is one of the rays, if I may so express it, of the great star of mountains which all concentrate at the Whartoo [now Hattu] Peak; whose fort-crowned summit commands every eminence for many miles round. From hence is perhaps the most glorious prospect in all the Hills. The forest, extending from the base to the utmost peak, is famed for the stupendous size of its pines; which have been accounted from one hundred and thirty to one hundred and sixty feet in height. [some other authors mentioned this place, 77.50429 lon. 31.2386 lat.] [Mundy 1832:310]
- 5) On the morning of the 7th of August [1847] we resumed our journey, descending abruptly through the village of Kotgarh to the Sutlej [Satluj]. At first the pine-forest which surrounded our night quarters, accompanied us down the steep hill-side. It was intermixed with a few scattered deodars; and the shrubby and herbaceous vegetation was in all its features identical with that of Shimla. [some other authors mentioned this place, 77.48255 lon. 31.31347 lat.] [Thomson 1978:49]
- 6) Ascents and descents were ceaseless, till we reached the bed of a torrent, which flows into the Sutluj [Satluj], and is spanned at this spot by a sanga [plank bridge]. A long, steep ascent, hot and scarcely shaded by a single tree, followed by a pretty wooded road, led to this village. [some other authors mentioned this place, 77.90182 lon. 31.55359 lat.] [Hervey 1853 Vol. III:114]
- 7) The road was good, winding very much, and crossing the Roonung pass [now Runang pass] 14,508 feet high, at the top of which the wind was as strong and as cold as yesterday. We found a great deal of juniper on the way, and the berries were large and well tasted, having little bitterness. [innermost area of the Satluj river among all descriptions, 78.46229 lon. 31.74933 lat.] [Gerard 1841b:299-300]
- 8) [near Joshimath] ... they had to ascend the mountain, towards a large plain and beautiful forest, consisting of cedars, cypresses, yew, holly, oak, walnuts, hazel-nuts, and horse-chestnuts ... [sole route]

[Hearsey 1835:109]

- 9) It is over the Jellourie Joth [now Jalori Pass] (which is the word for Pass, or High Mountain). The acclivity is steep and tedious; the path very good and the hills beautifully wooded with firs of two or three species, and various other trees ... [sole route] [Hervey 1853 Vol. I:370]

7.3.2 'Poor forest or barren and also nowadays poor or barren'

- 1) Here crossed the ridge and proceeded for a quarter of a mile upon the N. W. face through holly and on even ground, then recrossed the range and had plain road for one mile and a half, the Dhar lying on the left [near Barog, 77.3222 lon. 31.11776 lat., east slope] well-clothed with grass but unwooded. The latter two miles to camp was good. The first half a mile of the way upon the top of the range covered with pines on the northern slope: the next half mile crossed and recrossed the ridge, which is covered with holly and oaks to the left, ... [Gerard 1841a:201]
- 2) [near Roghi] The mountains latterly on either side of the river are craggy, and rent in every direction, almost destitute of soil, and thinly wooded, but in the vicinity of Kushbeer [unknown], which we passed half way, the ground slopes gradually to the Sutluj [Satluj] at some distance, and is thickly studded with hamlets and adorned with vineyards. [Gerard 1841b:302]
- 3) [near Rampur] The glen of the Sutluj [Satluj], at this season of the year, is insupportably hot; its width varying only from half a mile to a mile, while the mountains rise on either side of the river to elevations of 1500 to 3000 ft. Their sides [assumed to be the right bank side of the Satluj] are shattered and bare, and the scene though rude is noble. [Lloyd (ed.) Vo. I 1840:182]
- 4) [near Tikkar] The hills [77.63078 lon. 31.18903 lat.] about here are of a more gentle acclivity than those nearer the Pass, and, where wood does not grow, they are thickly cultivated. [Archer 1833:305]
- 5) I remained several hours at Plach [now Palach], or rather at a village a mile from the Thannah [unknown] of that place, called by some such name as Khaneh. There is another village near Plach, called Seddie. From this march to Ressaleh [now Rishala?] is a long ascent, the hills [77.35289 lon. 31.59096 lat.] are principally covered with grass and a few shrubs. [Hervey 1853:369-70]

7.3.3 'Rich forest but nowadays poor or barren'

- 1) [near Sairi] The first half mile it lay upon a right-hand hill, and through oak and boorans; the next half mile upon a left-hand hill, and likewise through oak and boorans, and the rest of the way sometimes upon the top of the range, and sometimes on one side through cheer and keloo [deodar] trees [77.04631 lon. 31.07377 lat.]. [Gerard 1841a:197]
- 2) [at Pinjore] The valley itself is thickly wooded, although in parts there is cultivation, and it is besides richly diversified by the tall, broken banks of the Kosilla which runs through it, adding a thousand smiles to this re-created Eden. [Lloyd (ed.) Vo. I 1840:128]
- 3) The western termination of the ridge [location is unidentifiable] is also designated by a mountain, of less considerable elevation than Jako [Jakhu], whose summit is destitute of trees, and crowned by a now nearly effaced ruin. The dark, deep, precipitous valley immediately below Simla [Shimla] on the south, is, as well as the neighbouring hills, thickly covered with pine-forests [77.18419 lon. 31.07333 lat.]. [Mundy 1832:232]
- 4) Chini [now Kalpa] occupies the most level, and therefore the most fertile, valley in Kunawar

[Kinnaur]. The village is prettily situated among deodar-trees, while below, and on either side of it, the slopes are disposed in a succession of terraces, some of them of considerable extent, richly cultivated with wheat, barley, and buck wheat. [Thomson 1978:78]

- 5) I saw three houses at Bhagsoo [now Bhagsu Nag]. A fine rhododendron forest covers the hill [76.34047 lon. 32.26035 lat.] along which the road winds, and many of the trees were glowing with the bright scarlet flowers. The old path from Dhurmsala [Dharamsala] to Bhgsoo is very bad and stony, but a good and tolerably broad road is half completed, and will be an immense improvement. [Hervey 1853 Vol. II:14]

7.3.4 ‘poor forest or barren but nowadays rich forest’

The description of this category is only one.

[near Rampur] The glen of the Sutluj [Satluj], at this season of the year, is insupportably hot; its width varying only from half a mile to a mile, while the mountains rise on either side of the river to elevations of 1500 to 3000 ft. Their sides [in this case, the left bank side of the Satluj is supposed²¹] are shattered and bare, and the scene though rude is noble. [Lloyd (ed.) Vo. I 1840:182]

7.3.5 ‘already deforested’

The descriptions of this category are only four.

- 1) In the immediate neighbourhood of the town of Deyra [now Dehradun, 78.03125 lon. 30.30294 lat.], the jungle has been cleared away, and the wheat crops are remarkably fine. [Mundy 1832:179]
- 2) [at Shimla] A forest, chiefly of pines, covered the sides and summits in every direction; but is now much thinned [77.18041 lon. 31.10332 lat.] by the clearance necessary to the building of between 100 and 200 houses, ... [Vigne 1842:29]
- 3) On the earlier part of the ridge [Mahasu ridge], the forest consists chiefly of pine, *P. excelsa* and *Abies Smithiana* being abundant, and more especially the deodar, which, on the slope facing the west, may be seen in the greatest profusion, thousands of young trees springing up in dense masses, on the slopes [77.25504 lon. 31.09748 lat.] which have been bared by the axe, or still more destructively by the fires of the hill-men. [Thomson 1978:32]
- 4) The road from Fagoo [Fagu] to Shimla is very pretty. The magnificent forest [77.28609 lon. 31.09233 lat.] between Fagoo and Muhasoo [Mahasu (now Kufri)] (which is about six miles from Fagoo) has been cut down in the most lamentable manner possible to make room for stupid, unromantic crops of potatoes. [Hervey Vol. I 1853:386-7]

There is another description of this category, but the location is not identifiable.

“I must not forget to mention that I again, *en passant*, paid a visit to the Surveyor-General in the Dhun [Dehradun], where he was encamped, for the purpose of measuring a base of verification, seven miles in length, the jungle being first cleared for that distance, and the level being carried across numerous hollows by means of movable wooden bridges. The manner in which everything [*sic*] was conducted appeared to me to be most admirable, and the whole establishment was on a scale that was worthy of the best days of the Hon. E. I. [East India] Company”. [Vigne 1842:39-40]

8 Conclusion

Followings are observed from this research.

Regarding the state of forest, the category 'rich forest and also nowadays rich' accounts for 62.1% of total number. At this point, given all the descriptions do not include the forest extent or density of trees, there is a possibility that some forests classified into a 'rich' category have become richer or poorer than the old ones.

Most places classified into 'poor forest or barren and also nowadays poor or barren' belong to rocky areas or face to the south slope, where only few trees can grow because strong sunbeams reduce soil moisture. Thomson argues, "The plainward face is never, except under very exceptional circumstances, at all wooded, while the northern and eastern slopes are generally covered with forest. Probably the more direct influence of the sun, and the action of the strong winds which generally blow up the valleys towards the interior of the mountains, act in concurrence in drying the atmosphere, and checking the growth of trees on the southern and western faces of the ridges" [Thomson 1978:6]. In some other cases, the reason of poor forest is due to development of cultivation.

The most notable point is percentage of the forests classified into 'rich forest but nowadays poor or barren' category is 15.3%. Although this writer is most interested in when, how and why these deforestations happened, those should be addressed in further research.

The forests categorised into 'already deforested' are no more than four (see 7.3.5). It is important to note that all of them belonged to the British territory at that time. One was near Dehradun, which was annexed to the British territory (then East India Company) in 1815, and its colonial development began in 1820s. "Roads and canals were constructed, cultivation spread over the waste lands ..." [Hunter Vol. IV 1885:172]. Furthermore, the hill stations of Mussoorie and Landour (both about 15km to the north from Dehradun) were established in 1827-1829 [Government of Uttarakhand 2007:6]. In the case of Shimla, which was ceded to the British territory at the end of Ghruka War, it had been originally developed as a sanitarium (hill station) in 1820s. In 1864, Shimla became practically summer capital of the Government of India [Government of Punjab 1888:107-8]. Mahasu (now Kufri) is approximately 8 miles and Fagu is approximately 11 miles away from Shimla to the east. Based on these findings, it is probable that those four cases of deforestation were caused by the colonial development in its early stage. Thomson further points out that the forests were destroyed "by the fires of the hill-men" in addition to "by the axe" [Thomson 1978:32]. From the expression "by the axe", it might be assumed that forests were destroyed in order to meet the demand in Shimla. As to the description of "by the fires of the hill-men", unfortunately, it is difficult to guess what the author actually implied because he did not explain in detail.

Equally important, the number of the case described as a 'poor forest or barren but nowadays rich forest' is as few as one. The cause of its change should not be underestimated regardless of its small number, and therefore, should be also addressed in the future study.

In summary, the research result based on the analysis of itineraries by mapping suggests that 78% of the forests before 1855 in the Western Himalayas had been rich even if source criticism is taken into consideration (see chapter 5). Moreover, most places classified into 'poor forest or barren and also nowadays poor or barren' belong to the area where growth of tree is difficult because of natural

environment. Therefore, it can safely be concluded that there was no distinct deforestation in the Western Himalayas before 1855 at least within the area the authors adopted in this paper visited. It should be noted that the forest policy by British Government had not been introduced in the area during this period.

My primary concern is to examine whether or not forests in India were destroyed under British rule. In regard of this point, the present study reveals no distinct deforestation was found in the Western Himalayas before British rule. Although the study is modest in size and depth, it thus might shed light on the forest situation in India before British rule. Further studies need to be carried out, in particular, as to when, how and why some forests shifted from the rich to the poor.

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¹ hereafter G-map

² hereafter Qgis

³ before 1858, East India Company

⁴ [Foster 1993], [Pires 1990], [Foster 1985], [Bernier 1983], [Ansari 2009], [Fryer 1992] etc.

⁵ volumes are counted separately

⁶ Place names hereafter are all today's, except in the direct quotation. Those place names are extracted mainly from Government document (e.g. Office of the Registrar General & Census Commissioner, 2011, *Himachalpradesh Administrative Divisions 2011*, Ministry of Home Affairs, Delhi, etc.) and G-map, if not, from old maps referred later. Travelling route includes this writer's supposition.

⁷ Wikisource, 2016, *Gerard, Alexander (1792-1839) (DNB00)*, retrieved January 24, 2019, from [https://en.wikisource.org/w/index.php?title=Gerard,_Alexander_\(1792-1839\)_\(DNB00\)&oldid=6563479](https://en.wikisource.org/w/index.php?title=Gerard,_Alexander_(1792-1839)_(DNB00)&oldid=6563479),

⁸ on G-map

⁹ on G-map

¹⁰ Dictionary of Welsh Biography, 2001, *LLOYD, Sir WILLIAM (1782-1857)*, retrieved February 5, 2019, from <https://biography.wales/article/s3-LLOY-WIL-1782>

¹¹ She moved through the Palang pass (5560m) to enter Spiti.

¹² Survey of India, 1874-1916, 1/253,440 (black and white)

Survey of India, 1916-18, 1/1,000,000

Survey of India, 1919-25, 1/126,720 (This writer utilises this map most because of its convenient scale, availability and appropriate colour.)

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¹³ [Hunter 1885-87]

¹⁴ [Yule et al. 1996]. According to this dictionary, the meaning of 'Boulee' is "well or reservoir" .

¹⁵ Figure 2 has been obtained by consulting the old map *Punjab No. 53 E/N.E.* (Survey of India, 1923) and author's wordings [Gerald 1841a:216-17].

¹⁶ This is judged from final mapping and same hereafter in this section.

¹⁷ longitude [data is identified by this writer]

¹⁸ latitude [ditto]

¹⁹ all direct citations, all the same in this clause

²⁰ Inside [] is a supplement by this writer, all the same hereafter in this clause.

²¹ Same description is adopted in 7.3.2 3). The right bank side of the Satluj is nowadays also barren, but there is rich forest on the left bank side.

²² Itineraries used for analysis were excluded (see 2.1).

²³ in Japanese: 玄奘 (水谷真成訳注), 1971, 『大唐西域記』, 平凡社, 東京

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Appendix I. All Mapping Point Data

(1) Forster 1798

id	longi	lati	comment	flag
1	78.1573	30.2181	p.197 Kaluwala...I stayed into the thickest part of the wood	1
2	77.8773	30.3284	p.200 From the Ganges to the Jumna... and interspersed with wood	3

(2) Gerard 1841 a

id	longi	lati	comment	flag
1	77.0463	31.0738	p.197 Syree through oak and boorans ; through cheer and keloo trees	3
2	77.1791	31.107	p.197-8 through keloo and oak trees with very thick underwood	3
3	77.1815	31.108	p.198 first five furlongs through oaks	1
4	77.2058	31.111	p.199 covered with oaks on the north face and	1
5	77.2105	31.1029	p.199 Keloos on the south	1
6	77.2156	31.1113	p.199 upon soil with oaks to the left	1
7	77.2193	31.1088	p.199 and Keloos to the right	1
8	77.2343	31.1212	p.199 upon a left-hand Dhar covered with a very thick forest of Deodars	1
9	77.2646	31.1001	p.199 steep ascent upon a right-hand hill and through Keloo trees	1
10	77.2776	31.0975	p.199 and produces oak and the spices of pine called Deodar or Keloo	1
11	77.2955	31.0863	p.200 through a thick forest of Keloo and Rooo trees	1
12	77.3113	31.0958	p.200 There are no trees on the way	2
13	77.3275	31.0943	p.200 towards the bottom of a deep right-hand dell there is a thick holly forest	3
14	77.3155	31.1091	p.201 through holly	1
15	77.3222	31.1178	p.201 Dhar lying on the left unwooded	2
16	77.3347	31.1236	p.201 the top of the range covered with pines on the northern slope	1
17	77.3507	31.1275	p.201 the ridge is covered with holly and oaks to the left	1
18	77.3668	31.1078	p.201 the way lying upon the left and latterly upon the right with keloo and mourou trees in the dells	3
19	77.39	31.1277	p.202 To the right below are many fine large pines	1
20	77.417	31.2335	p.203 Dhars sometimes covered with pines and holly	1
21	77.4279	31.2491	p.203 sometimes bare, with nothing but short grass.	2
22	77.4639	31.2295	p.203 in general well clothed with pines of different kinds	1
23	77.4457	31.2526	p.203 There are pines and holly trees here and there but not in any great quantity	2
24	77.4662	31.2519	p.203 Narkand to Hatu: first mile thickly covered with Khuroo trees	1
25	77.5018	31.2445	p.203 Hatu: forest of various sorts of pines and holly Deodar Pundro larch yew holly	1
26	77.485	31.3183	p.206 Kotgarh to Shathala the face of a right-hand range thickly covered with cheer and keloo trees	3
27	77.5136	31.3215	p.206 right-hand Dhar which is here covered with oak forest	1
28	77.5273	31.305	p.206 through oaks upon a right-hand slope	1
29	77.5275	31.3229	p.206 a descent winding much and slanting through oaks upon a right-hand slope	3
30	77.5699	31.3313	p.207 all the way from camp lying upon the face of a right-hand range which is covered with pines	1
31	77.5993	31.3219	p.207 winding upon a right-hand Dhar covered with fir and oak forest	1
32	77.6378	31.3386	p.208 covered with different kinds of forest trees and very high	3
33	77.6042	31.424	p.210 Kooloo is a lofty chain of precipitous mountains covered with kanta and kurenda bushes to the top	2
34	77.6318	31.482	p.214 The range across the river is generally rugged and barren	2
35	77.7421	31.4867	p.215 lying upon a right-hand range and mostly through oak and Keloo trees	1
36	77.7539	31.4891	p.215 is covered with oaks to Mujeoulee	3

37	77.8271	31.5365	p.216 difficult descent through thick forest to the Kooltulargh	1
38	77.7976	31.5677	p.217 Across the Sutluj the mountains are more precipitous in a few parts clothed with low Jungul but mostly bare	2
39	77.8758	31.556	p.218 upon the brow of a right-hand hill covered with oak and Boorans	1
40	77.8869	31.5533	p.218 a steep and difficult hill covered with large Keloos to a Debee	3
41	77.9066	31.5517	p.219 the face of a right-hand hill covered with yew trees	1
42	77.9088	31.5291	p.219 both the streams are large and descend from the Himalaya through pine forests	1
43	77.9164	31.5424	p.220 an ascent over rocks and through a forest of oak and Boorans	1
44	77.9425	31.5564	p.220 The next mile and a half was excellent and broad road through lofty Keimung trees	1
45	77.9615	31.552	p.220 at first covered with oaks	1
46	77.9707	31.5542	p.220 afterwards [covered] with pines	1
47	77.917	31.576	p.220 for the first six miles have a barren	2
48	77.9651	31.5807	p.220 In the last two miles their summits are covered with pines	3
49	77.9933	31.5485	p.221 above it with oak and pine forest	1
50	78.0236	31.5447	p.223 covered with pines above	3
51	78.058	31.5263	p.224 scarcely any vegetation	2
52	78.0373	31.5361	p.225 barren until about half way up	2
53	78.0309	31.527	p.225 clothed with firs	1
54	78.0651	31.5175	p.225 latterly they are completely covered with extensive forests of pine	1
55	77.8916	31.3211	p.245 Across the Undretee the range is covered with different kinds of fir	1
56	77.8556	31.2285	p.248 across which is a range covered with pines	1
57	77.6547	31.264	p.252 This range must be upwards of 10000 feet it has many Kyl Keloo Row and yew	3
58	77.5963	31.2564	p.252 through dark-coloured forests of Mourou	3
59	77.5958	31.2511	p.253 To the left below are pines mostly of the Row and Kyl kind	1
60	77.5873	31.2466	p.253 through Mourou trees	3
61	77.5838	31.245	p.253 the first half of the way through very thick Mourou woods	3
62	77.5129	31.2434	p.253 last three quarters of a mile through Khursoo and Mourou trees	1
63	77.5206	31.2409	p.253 The first mile through thick holly	1
64	77.5329	31.2724	p.255 a left-hand range through a thick wood of Roo Kyi Keloo yew and horse-chestnuts to Noon	1
65	77.4127	31.2697	p.256. Seven furlongs road good mostly through pines ascending to Kuehen Ghatee	1
66	77.3896	31.2712	p.256 descending slightly upon a left-hand range and through oak and fir	1
67	77.3635	31.2707	p.257 through a thick forest of oak Cheer Keloo and other trees	3
68	77.2582	31.2587	p.259 The hills on this side of the Sutluj have pines on their summits	3
69	77.2499	31.2645	p.259 those across are generally bare	2
70	77.1295	31.2503	p.262 The hills ... are covered with brush-wood but have no trees	2

(3) Gerard 1841 b

id	longi	lati	comment	flag
1	78.4623	31.7493	p.300 We found a great deal of juniper on the way	1
2	78.4417	31.6888	p.300 We found a great deal of juniper on the way	1
3	78.4249	31.5926	p.300 for the last four miles led through forests of pine upon the right bank of the Sutluj	1
4	78.2532	31.4948	p.302 The mountains latterly on either side of the river are craggy... and thinly wooded	2
5	78.2197	31.5258	p.302 The mountains latterly on either side of the river are craggy... and thinly wooded	2
6	77.9369	31.5565	p.304 through shady groves of lofty pines from twenty to twenty-seven feet in circumference	1
7	77.9099	31.5513	p.304 amongst extensive forests of oak yew pine and horse-chestnut to camp	1
8	77.814	31.5251	p.305 The mountains near this are heavily	1

			wooded to their summits	
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(4) Hearsey 1835

id	longi	lati	comment	flag
1	79.6217	30.5877	p.109 beautiful forest consisting of cedars cyprresses yew holly oak walnuts hazel-nuts and horse-chestnuts	1
2	79.6021	30.4901	p.116 Beautiful and grand forests of fir oak holly maples [by editor]	1
3	79.5568	30.5235	p.117 About two miles above Jotsheemuth... is a most beautiful belt of forest consisting of cedars firs cyprresses [by editor]	1
4	76.8538	31.9666	p.172 They halted at a place in the jungle, called Goommah	1
5	77.0779	31.8238	p.172 The ascent was mostly through a forest of very large fir trees and descending likewise	3
6	77.0741	31.8267	p.172 The ascent was mostly through a forest of very large fir trees and descending likewise	1
7	77.0852	31.8348	p.172 The ascent was mostly through a forest of very large fir trees and descending likewise	1
8	77.0897	31.8381	p.172 The ascent was mostly through a forest of very large fir trees and descending likewise	3

(5) Moorcroft *et al.* 1989

id	longi	lati	comment	flag
1	78.3073	30.3673	p.22 and continues through a forest of birch and pine	1
2	76.896	30.8078	p.35 On quitting Pinjor we proceeded through a jangal of the small variety of prickly bambu	3
3	76.8289	31.9835	p.157 The road ran ... through a thick wood of pine trees covering the side of a steep hill	1
4	76.8675	31.9519	p.163 we passed through a wood of stately cyprress trees some of which must have been eighty feet high	1
5	77.0904	31.8044	p.168 a black forest of pines frowned beneath our feet	1
6	77.0601	31.7991	p.176 It brought us once more into the region of the rhododendron the cedar and the oak	1
7	77.2198	32.4343	p.193 The road led us along the foot of the bare cliffs of Kuksar	2

(6) Lloyd (ed.) Vol. I 1840

id	longi	lati	comment	flag
1	76.7265	31.077	p.99 The road ... lies through ... a thick jungle of bamboos	1
2	76.7934	31.0918	p.102 Ramghur... The pine is abundant	3
3	76.7769	31.1953	p.103 above the Gumbur ... covered with wood	1
4	76.8045	31.2192	p.109 here and there large pinewoods sweep down in rich dark green masses	1
5	76.8919	30.8156	p.126 to Pinjore more wooded	3
6	76.9197	30.8002	p.128 The valley itself is thickly wooded	3
7	76.9763	30.9216	p.130 excellent road which lay through jungle	1
8	77.0332	31.0548	p.139 the road lay through a noble wood of cedars	1
9	77.1835	31.1006	p.145 Jukkoo is mantled with hoary cedars oaks clustered with acorns and Rhododendron-trees	1
10	77.2319	31.119	p.149 The woods ... were large and stately, filled with towering cedars and noble oaks.	1
11	77.2812	31.094	p.150 filled with forests of the finest cedars	1
12	77.3009	31.0867	p.152 The road lay still through cedar forests	1
13	77.3851	31.134	p.155 The ascent of the Kunnaug traversed fine woods of oak and fir	1
14	77.4586	31.2405	p.159 nullah above which the Naugkunda Gaut passed through woods of cedar and oak	1
15	77.4679	31.247	p.164 Wartoo peak covered with charming woods	1
16	77.4613	31.2548	p.161 Huttoo overshadowed by a thick forest of cedar	1
17	77.4988	31.2714	p.165 The woods we passed through were very fine	1
18	77.6296	31.4603	p.182 Their sides are shattered and bare	2
19	77.6381	31.4502	p.182 Their sides are shattered and bare	4
20	77.6791	31.457	p.189 it passed through some pleasant woods of pine and other trees	1

21	77.7482	31.4922	p.192 On our route were many shady woods	1
22	77.7575	31.4879	p.194 The oak is found wild	1
23	77.7931	31.5112	p.196 Sooraan is situated on a wooded ridge from the Himalaya	1
24	77.7193	31.4823	p.201 Gowra_Rampur nearer mountains crested with pines	1
25	77.4818	31.3157	p.202 descended through woods; after traversing another pine-forest	1
26	77.556	31.2323	p.208 beautiful pine-forests upon their sides and along their crests	3
27	77.5639	31.2221	p.210 through fine masses of cedar pine and oak	1
28	77.6359	31.1911	p.213 they are barely wooded	2
29	77.9286	31.2606	p.226 From Kauhool amongst shady trees this are pine-woods of great size	3
30	77.9672	31.2622	p.229 noble deodars oaks sycamores and other trees	3
31	77.998	31.3084	p.230 surrounded by handsome deodars chestnuts and oaks	3
32	78.0104	31.3211	p.233 Above the fields are large woods of stately cedars oaks and pines	3

(7) Lloyd (ed.) Vol. II 1840

id	longi	lati	comment	flag
1	78.1966	31.4416	p.39 descending through pines currants and roses brought us to Soang	3
2	78.2171	31.4333	p.40 through many varieties of forest-trees	1
3	78.3768	31.3758	p.52 Chitkul from Rakecham entering a beautiful and heavy forest of pines	3
4	78.5044	31.5132	p.84 enjoyed the shade of fine forests of Deodar and Newsa	1

(8) Mundy 1832

id	longi	lati	comment	flag
1	78.1433	30.0831	p.174 in a thick forest near the small chokee of Karsrah	1
2	78.0367	30.2121	p.178 The first half of the day's journey led through a thick forest of very lofty trees	1
3	78.0313	30.3029	p.179 In the immediate neighbourhood of the town of Deyra the jungle has been cleared away and the wheat crops are remarkably fine	5
4	78.1068	30.455	p.189 Among the various and beautiful trees and shrubs	1
5	78.0929	30.3401	p.192 Kalunga is situated on a lofty woody hill	1
6	77.8996	30.3215	p.193 the centre is grassy and swampy, and free from trees	2
7	77.5556	30.416	p.203 It issues upon the Doon through a beautiful defile flanked by richly-wooded hills	1
8	77.5968	30.4077	p.203 It issues upon the Doon through a beautiful defile flanked by richly-wooded hills	1
9	77.5231	30.453	p.204 completely encompassed by woody heights	1
10	77.385	30.5162	p.206 I strolled out among the wooded hills	1
11	77.2739	30.6326	p.215 backed up by a woody mountain	1
12	77.2228	30.6589	p.216 The first half of our march led through a pine forest	1
13	77.1681	30.7424	p.219 The country we traversed was more barren and rocky than the march of yesterday	2
14	77.0483	31.0797	p.224 Sahree is below the range in which the pine flourishes	1
15	77.1826	31.0989	p.232 Jako which is thickly wooded from base to summit	1
16	77.1842	31.0733	p.232 immediately below Simla on the south is... thickly covered with pine-forests	3
17	77.2781	31.0947	p.255 The chief lion of Mahasoo is a wood of the most enormous pines	3
18	77.5375	31.1166	p.259 Ere we descended upon Khote-kie, we traversed a wood	1
19	77.5542	31.1213	p.263 The mountains here are less wooded and precipitous and have more arable land	2
20	77.7045	31.1217	p.267 scenery was tamer trees more scarce	2
21	77.876	31.2453	p.272 beautifully fringed with magnificent alders and other trees of gigantic size	3
22	77.6331	31.1919	p.304 We encamped in a fine grove of cedars on the summit of a lofty mound	3

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23	77.6308	31.189	p.305 where wood does not grow they are thickly cultivated	2
24	77.4806	31.3099	p.308 beautifully situated on the side of a gently sloping mountain, well wooded	1
25	77.4977	31.2644	p.309 through perhaps the finest forest scenery that we had yet met with	1
26	77.5043	31.2386	p.310 The forest extending from the base to the utmost peak is famed for the stupendous size of its pines	1

(9) Archer 1833

id	longi	lati	comment	flag
1	76.9883	30.8515	p.205 with plenty of wood	1
2	77.1352	31.0991	p.213 We passed through a forest of large pine and oak, and among them the rhododendron in all its blaze of beauty	1
3	77.3427	31.1258	p.219 the slopes of them generally bare	2
4	77.3224	31.1052	except the northern, which were thick with pine and oak	1
5	77.4583	31.2623	p.220 On leaving Nakundah the road led through a thick wood	1
6	77.4317	31.3622	p.222 The sides of the mountains are bare of verdure	2
7	77.4016	31.528	p.231 the path led through a wood of larch, deodar, and oak	3
8	77.5473	31.5763	p.246 Low down, thick forests and bare rocks are interspersed	1
9	77.5292	31.5879	p.246 Between these two peaks a dark forest of huge pines stretches	1
10	77.5633	31.5564	p.247 The east side of the valley is bare	2
11	77.5745	31.4241	p.250 The town is on the brow of a bare, rocky hill	2
12	77.6223	31.3997	p.253 Nothing but bare mountain to be seen all the way	2
13	77.2656	31.0957	p.268 a dark forest of huge pines, many of them twenty feet in girth, and one hundred and twenty feet high	1
14	77.3344	31.0805	p.269 the mountains bare of forest	2
15	77.4558	31.0822	p.271 The extensive prospects were grand much forest to the left and below us	1
16	77.4828	31.0792	p.272 The pass had much thick wood	1
17	77.6528	31.068	p.277 the road wound through a forest of cedars, oak, and pine, and so thick did they stand	1
18	78.0242	31.3157	p.293 The sides were feathered with pines some growing out almost horizontally	1
19	78.0508	31.3425	p.293 through a large wood of cedars and oaks	1
20	78.0699	31.3503	p.296 Passed through another wood, abounding with birch-trees and nuts	1

(10) Vigne 1842

id	longi	lati	comment	flag
1	77.184	31.1032	p.29 A forest chiefly of pines covered the sides and summits in every direction	1
2	77.1804	31.1033	p.29 but is now much thinned by the clearance necessary to the building of between 100 and 200 houses	5
3	77.492	30.863	p.34 its sides are clothed with a dark and dense pine forest many of the trees of which are immensely large both in girth and height	1
4	77.4651	30.8713	p.34 its sides are clothed with a dark and dense pine forest many of the trees of which are immensely large both in girth and height	1
5	76.3945	31.264	p.58 whilst the pinus longifolia elms willows gentian geraniums campanula roses and other plants	3
6	76.9338	31.6904	p.79 the pathway... lies through a quiet well-wooded glen	1
7	76.0135	32.5154	p.150 amongst the picturesque banks and inequalities on its summit and the fir-trees with which they are covered	1

(11) Hügel 1836

id	longi	lati	comment	flag
1	76.5351	32.0986	p.344 is a plain ... overgrown with jungle and without cultivation	3

(12) Hügel 1845

id	longi	lati	comment	flag
1	76.5144	31.6817	p.36 tent pitched under a fig-tree. The magnificent foliage of the mango fig and musa paradisaica plantain is intermingled	1
2	76.5125	31.6687	p.39 gentle ascent through a wood of pines	1
3	76.1676	31.9976	p.48 The country was generally hilly wild and overgrown with jungle	1
4	76.1472	32.0411	p.51 Bilaspour... is the lowest declivity of the Himalaya which forms a forest-crowned height	1

(13) Markham 1854

id	longi	lati	comment	flag
1	77.0964	32.3523	p.222 we had good ground and abundance of wood	1

(14) Thomson 1978

id	longi	lati	comment	flag
1	76.9351	30.8244	p.4 low hills around Kalka is barren and uninviting	2
2	76.9188	30.8347	p.4 low hills around Kalka is barren and uninviting 2	2
3	76.9573	30.8993	p.6 winding round its most projecting part enters a fir-wood	1
4	76.9536	30.8784	p.6 The plainward face of this range ... is quite devoid of forest	2
5	76.9681	30.9076	p.7 inner slope is ... covered ... with an open forest of a species of fir (Pinus longifolia)	1
6	76.9913	30.8953	p.7 To the south-east ... again rises into the finely wooded hill	1
7	77.017	30.8644	p.9 Still further to the south are deep dells with bare and rugged slaty mountains	2
8	76.9927	30.8768	p.9 Still further to the south are deep dells... scarcely at all wooded	2
9	76.9786	30.9128	p.10 the ridge for a very short distance... which is quite bare of trees	2
10	76.9882	30.9173	p.10 The greatest part of the descent is bare of trees	2
11	76.9847	30.9146	p.10 except along the banks of the little stream which are covered with a belt of wood	1
12	76.9901	30.9145	p.10 except along the banks of the little stream which are covered with a belt of wood	1
13	76.968	31.0227	p.11 The Gambar river where the road crosses it... quite devoid of trees	2
14	77.0246	31.0481	p.13 The hills which are generally grassy... are quite devoid of forest... except in a few shady nooks with a northern exposure...	2
15	77.1711	31.1138	p.18 immediately on gaining the top of the ridge on which the station is built we enter a fine forest	1
16	77.1835	31.0976	p.19 Pirms excelsa is also a very common species at Simla particularly on the southern face of Mount Jako	1
17	77.1782	31.1006	p.19 the deodar, the fourth species, is common on the southern and western slopes of Jako	1
18	77.1512	31.0692	p.19 deodar ... in shady groves at the bottom of the valleys on both sides of the ridge	1
19	77.1938	31.103	p.30 descends... to a low part of the ridge elevated about 6800 feet and quite bare of trees	2
20	77.2286	31.1152	p.31 to the right bare	2
21	77.2379	31.1195	p.31 further on an oak-wood	1
22	77.266	31.1008	p.32 for a mile through fine trees of deodar and spruce (Abies Smithiana)	1
23	77.2713	31.0953	p.32 as it is throughout well wooded the road along it is extremely beautiful	1
24	77.255	31.0975	p.32 thousands of young trees springing up in dense masses on the slopes which have been bared by the axe	5
25	77.2765	31.0948	p.33 consists of a succession of rounded knolls covered with grass and quite bare of trees	2

26	77.2751	31.0869	p.35 On Mahasu they[trees] are entirely confined to the crest of the ridge and form no part of the forest below	2
27	77.2866	31.0904	p.35 enter the forest on the northern face	1
28	77.2885	31.0881	p.35 after a few hundred yards of bare stony slope	2
29	77.2957	31.0868	p.35 among dense forest among which it continues for a couple of miles	1
30	77.3084	31.0871	p.36 The mountains to the right which dip into the valley of the Giri are bare of forest	2
31	77.3014	31.0923	p.36 On the left hand the deep valley which runs towards the Sutlej is full of forest	1
32	77.3063	31.0898	p.36 not rising however to the ridge which is bare	2
33	77.3731	31.1102	p.37 Beyond Theog the road rises a little and is covered with brushwood on the left hand but bare on the right	2
34	77.3805	31.1334	p.37 The northern face of this hill is prettily wooded with the holly-leaved oak	1
35	77.3874	31.2104	p.38 The valley on the left tributary to the Sutlej is well wooded	1
36	77.4018	31.2102	p.38 on the right is rather bare	2
37	77.4116	31.2133	p.38 facing nearly due south very bare stony and barren	2
38	77.4265	31.2514	p.38 the remainder of the road lies through beautiful forest	1
39	77.406	31.1895	p.39 Rhododendron continue to the very bottom of the descent and Pinus excelsa is common on the eastern slope	1
40	77.4586	31.2398	p.39 The ascent from the ravine was well wooded in its lower part with oak and pine	1
41	77.4567	31.2517	p.40 The upper part of the ascent was bare and grassy	2
42	77.4636	31.2625	p.41 The whole of this valley is occupied by dense forest	1
43	77.4766	31.2514	p.42 the ridge becomes covered with forest at first principally pine spruce and silver fir	1
44	77.505	31.2432	p.42 The top of the mountain is steep and bare towards the east	2
45	77.4572	31.2653	p.45 through a forest of large pines principally P. excelm and spruce	1
46	77.4631	31.2949	p.46 Along the banks of these streams, the forest is very dense and shady	1
47	77.4702	31.2947	p.46 Along the banks of these streams, the forest is very dense and shady	1
48	77.4563	31.2809	p.47 They occupy the bottom of deep ravines and are in their whole course densely wooded	1
49	77.4764	31.2874	p.47 They occupy the bottom of deep ravines and are in their whole course densely wooded 2	1
50	77.467	31.2986	p.48 at first gradually ascending through fine shady woods	1
51	77.4687	31.3097	p.48 mounting rapidly by very abrupt zigzags up a bare dry hill-side	2
52	77.4826	31.3135	p.49 At first the pine-forest ... accompanied us down the steep hill-side	1
53	77.4882	31.3154	p.49 the descent was on a bare hill-side	2
54	77.5149	31.3386	p.51 The want of wood	2
55	77.6138	31.4626	p.51 with steep bare hills on either side quite devoid of trees and covered only with a few scattered bushes	2
56	77.6533	31.4347	p.51 with steep bare hills on either side quite devoid of trees and covered only with a few scattered bushes	2
57	77.6981	31.4749	p.57 the slopes became well wooded with Rhododendron and Oak	1
58	77.7103	31.475	p.58 the road ascended abruptly up a well-wooded slope on the north ern face	1
59	77.7224	31.4808	p.58 is well wooded with the ordinary trees of the temperate zone of the Himalaya	1
60	77.7541	31.4888	p.59 A great part of the descent was bare	2
61	77.7643	31.4868	p.59 A great part of the descent was bare	2
62	77.7722	31.4867	p.59 The ascent on the east side was long steep... well-wooded slopes	1
63	77.7731	31.5013	p.60 to Serahan through beautiful forest of oak and pine	1
64	77.7957	31.508	p.60 surrounded on all sides by pineforest	1
65	77.7957	31.5129	p.60 surrounded on all sides by pineforest	1
66	77.7924	31.5102	p.60 surrounded on all sides by pineforest	1
67	77.7999	31.5106	p.60 surrounded on all sides by pineforest	1
68	77.821	31.5392	p.61 The road lay through beautiful forest	1

69	77.8148	31.548	p.61 the deep and well-wooded valleys below	1
70	77.8437	31.559	p.61. Forest continued to the bottom of the descent	1
71	77.8941	31.5597	p.62 in the midst of a fine forest of deodar-trees	1
72	77.8988	31.5558	p.63 densely wooded with deodar and pine	1
73	77.9092	31.539	p.64 its ravine is beautifully wooded	1
74	77.9192	31.5447	p.64 through woods of oak and pine	1
75	77.9459	31.5569	p.64 situated in a grove of very large deodar-trees	1
76	77.9863	31.5551	p.66 very little natural wood	2
77	77.986	31.5591	p.66 the bare arid and rocky hills between Nachar and the river	2
78	78.0086	31.5436	p.66 the banks on both sides are very rocky and bare	2
79	78.0109	31.5463	p.66 the banks on both sides are very rocky and bare	2
80	78.0186	31.5431	p.69 The spur was bare of trees	2
81	78.0634	31.5277	p.69 through a dry treeless tract	2
82	78.1503	31.5296	p.73 through a pretty wood of deodar and Gerard's pine	3
83	78.165	31.5227	p.74 The slopes were nearly bare	2
84	78.2423	31.5197	p.78 through a forest of deodar in which some of the trees were of large size	1
85	78.2532	31.5326	p.78 prettily situated among deodar trees	1
86	78.248	31.5324	p.78 prettily situated among deodar trees	1
87	78.2512	31.5304	p.78 prettily situated among deodar trees	1
88	78.251	31.5347	p.78 prettily situated among deodar trees	3
89	78.2611	31.5598	p.79 a pleasant forest of deodar and Gerard's pine was entered	1
90	78.2976	31.6072	p.79 a mile and a half through fine forest	1

(15) Hervey Vol. I 1853

id	longi	lati	comment	flag
1	76.3348	32.2481	p.30 A dense black forest lies just above Bhagsoo and looks dark and gloomy	3
2	76.8126	31.9851	p.38 beautifully wooded with magnificent Pine trees	1
3	76.853	31.9629	p.42 and through a beautiful Fir and Rhododendron forest	3
4	77.0844	31.8056	p.59 This mountain is so beautifully and densely wooded	1
5	77.1726	31.8481	p.60 small islands overgrown with alder trees	1
6	77.1659	32.1097	p.68 There is a magnificent forest of Pine Trees covering the hill	1
7	77.2136	32.0888	p.68 and deep snow covers the summits of these wooded mountains	1
8	77.216	32.195	p.74 The valley of the Beés is gradually becoming narrower and the hills on both sides are densely wooded	1
9	77.1754	32.1912	p.74 The valley of the Beés is gradually becoming narrower and the hills on both sides are densely wooded	1
10	77.1647	32.2925	p.76 The surrounding hills are covered with magnificent forests of Fir trees	3
11	77.18	32.2863	p.77 This spot is thickly wooded with Alder Trees	1
12	77.1943	32.3229	p.79 The mountain we ascended was wooded a great part of the way	1
13	77.1404	31.9991	p.92 It is a pretty wooded place a little above the road	1
14	77.1574	32.1115	p.362 beautiful trees cover the sweet valley below	1
15	77.2178	31.7283	p.366 bare of trees though well covered with grass and flowers	2
16	77.2206	31.7227	p.366 The opposite heights are well wooded	1
17	77.3529	31.591	p.369 the hills are principally covered with grass and a few shrubs	2
18	77.3726	31.5384	p.370 the hills beautifully wooded with firs of two or three species	1
19	77.3831	31.5306	p.370 The principal tree for the first two or three miles of the deelvity ... Khurson	1
20	77.4394	31.4573	p.371 Near Shumsher the Kussowlie fir-tree covers the hills through which the road passes	1
21	77.4611	31.253	p.375 The trees which thickly covered the mountains around me looked so dark and gloomy	3
22	77.2861	31.0923	p.386 The magnificent forest ... has been cut down ... to make room for... potatoes	5
23	77.1121	31.1029	p.390 the hills are bare and uninviting	2

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(16) Hervey Vol. II 1853

id	longi	lati	comment	flag
1	76.2497	31.9776	p.11 hills verdant with shrubs or wooded with trees	3
2	76.3405	32.2604	p.14 A fine rhododendron forest covers the hill along which the road winds	3

(17) Hervey Vol. III 1853

id	longi	lati	comment	flag
1	78.2771	31.5952	p.90 plenty of trees	1
2	78.264	31.5656	p.92 nearly the whole way prettily wooded with firs	1
3	78.2305	31.5021	p.101 The entire march was well wooded and	1

			the trees were very fine specimens of fir and walnut	
4	78.1787	31.476	p.102 a long and steep ascent refreshingly wooded	3
5	78.1773	31.4599	p.105 The hills around are covered with trees and thick underwood	1
6	78.1433	31.5078	p.107 the hills are thickly wooded principally with firs	1
7	78.0707	31.512	p.110 fir and holly thickly wood the hills surrounding	1
8	77.9018	31.5536	p.114 by a pretty wooded road led to this village	1
9	77.7404	31.4849	p.133 The hills from Gaura upwards are beautifully wooded with firs of various kinds oaks rhododendrons	3

Appendix II. Final Map by Qgis (a small portion of the upper and lower part was omitted)

