The Kalka – Shimla Railway

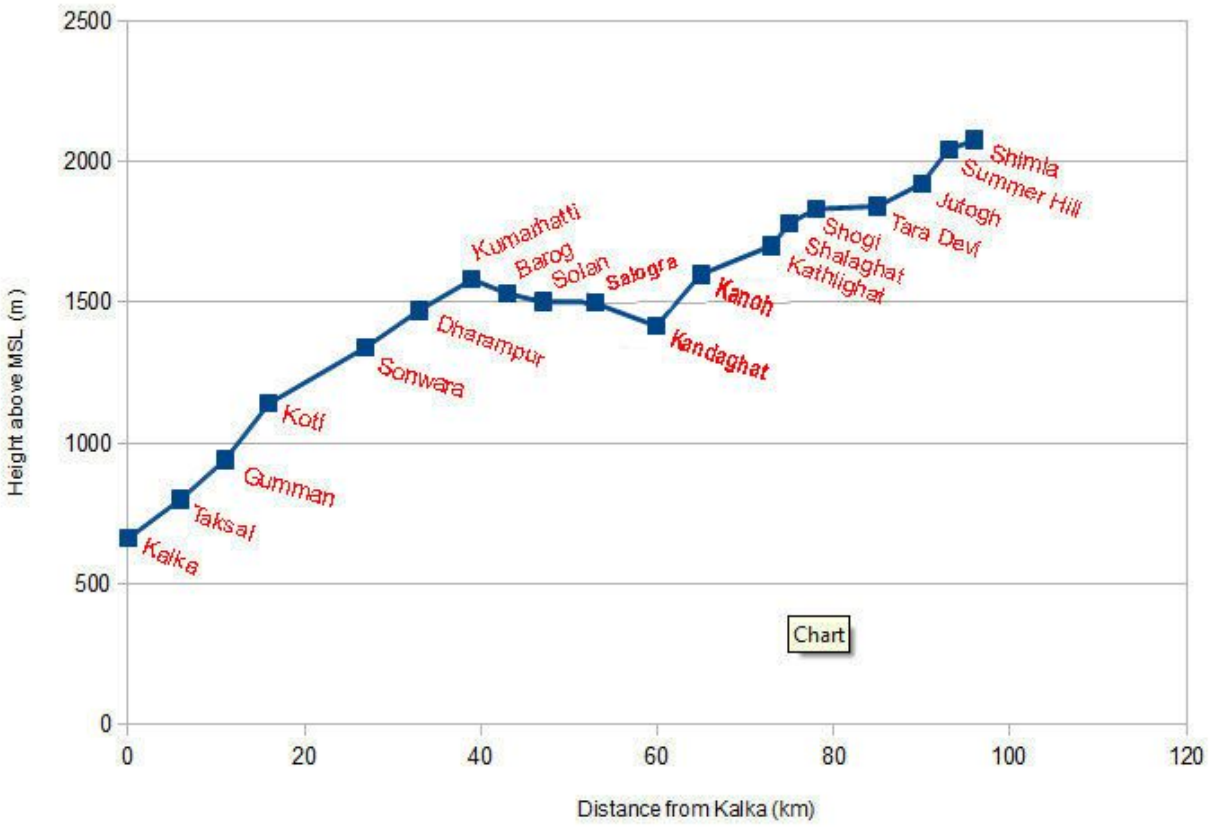
In November 2013 I travelled on the Kalka to Shimla narrow gauge railway. As the train climbed into the Himalayan foothills, I could not help wondering two things. Firstly, why did the British choose Jakhu hill on which to build their summer capital in preference to any of the many other 2000 m peaks that rose all around? And secondly, how was it possible to construct an adhesion railway whose maximum gradient is about 1:25 through terrain where the average gradient must be about 1:5?

It was only when I got home and was able to study the terrain closely with the aid of Google Maps that the answers became clear.

A brief description of the route

Kalka station is 660m above sea level. The railway climbs to 1415m in 96 km at an average gradient of 1:68 with a maximum gradient of 1:33. It takes about 5 hours at an average speed of 20 kph

Gradient profile



(Note that altitudes and distances are approximate only. In particular, some of the altitudes quote on the station name boards refer to the altitude of the town, not the altitude of the station.)

The southern section

Kalka (660) to Taksal (800) – 6 km at 1:42

The railway climbs steadily through the expanding town in a series of tight loops after crossing the Jajra Nadi.

Taksal (800) to Gumman (940) – 5 km at 1:36

The railway enters a valley and climbs up to Gumman in a series of reverse loops the second of which includes a short tunnel.

Gumman (940) to Koti (1140) – 6 km at 1:30

The line clings to the side of the valley with glimpses of the road and motorway below.

Koti (1140) to Sonwara (1340) – 10 km at 1:50

Koti station

Immediately after Koti station the line enters the second longest tunnel on the route which is 694 m long. It is a little difficult to see the purpose of this tunnel as it merely cuts off a shoulder of the mountain. Little by little, the road rises to meet the railway and 2 km short of Sonwara, at Jabli there is a level crossing – the only one on the route.

Sonwara (1340) to Dharampur (1470) – 6 km at 1:46

The reverse loops below Dharampur

After Sonwara the line enters a delightful double switchback to claw up some height and finally, after tunnelling through the ridge, reaches the road – and the Continental Divide – at Dharampur station. From now on, water in the valleys on the right flow into the Ganges and out into the Bay of Bengal at Kolkata; valleys on the left drain into the Arabian sea via the Sutlej and Indus rivers.

Dharampur (1470) to Kumarhatti (1580) – 6 km at 1:55

Between Dharampur and Solan, a fault line runs from NW to SE across the route of the railway. The watershed along this valley is at Kumarhatti and lies at an altitude of 1580 m. To get there, the railway contours round the northern slope of the mountain and then sidles across the valley almost without you noticing that you have actually just crossed a vital bridge which connects the Sivalik hills or Sub-Himalayan ranges to the Marhabarat ranges of the Himalaya.

Kumarhatti (1580) to Barog (1530) – 4 km at -1:80

Having crossed the valley, the railway now faces a long ridge 300 m high blocking its route. The main road has to go right round the end adding an extra 8 km but the railway engineers chose to burrow through the ridge using a 1144 m long tunnel which emerges at Barog station – the prettiest station on the route and the usual stop for a comfort break of 10 minutes.

Barog station

Barog (1530) to Solan (1500) – 4 km level

The town of Solan is situated on a broad saddle on the Continental Divide overlooked by the 2000 m summit of Mount Karol. It is an ideal place for a town with plenty of space for housing and industry but it was not high enough for the British who wanted cool air and huge vistas.

Solan (1500) to Salogra (1500) – 6 km level

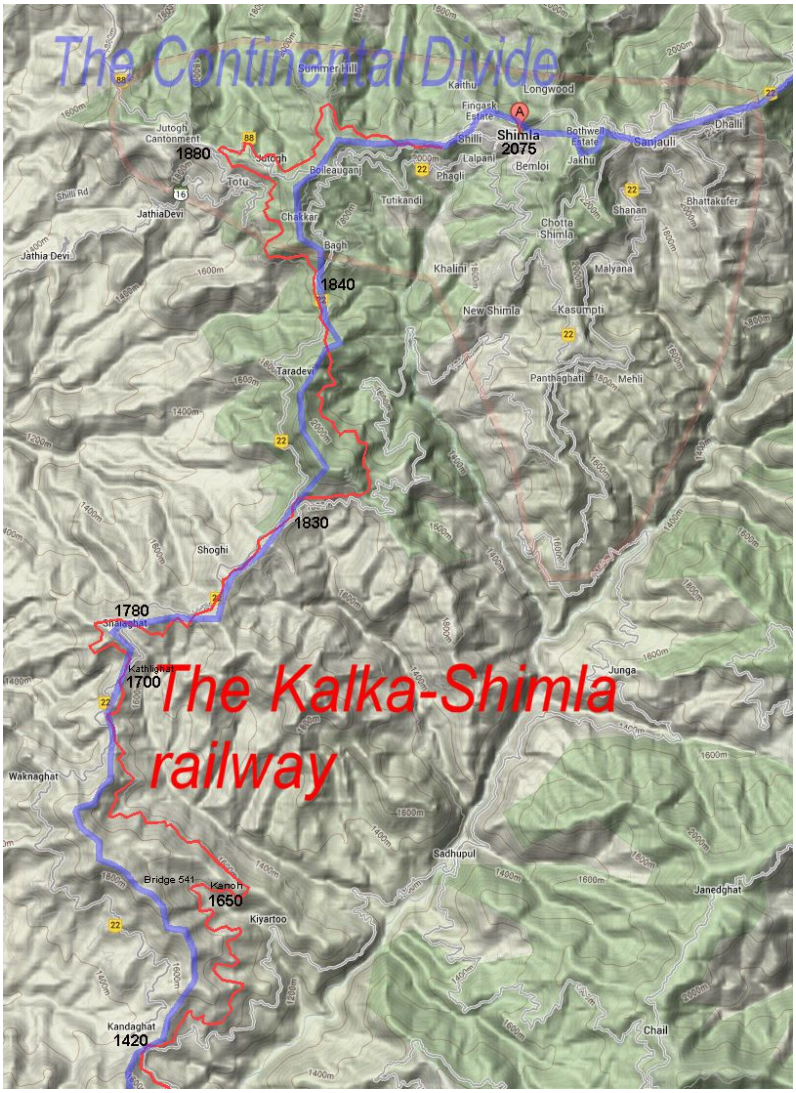
The first task of the railway is to contour round the base of Mt Karol.

Contouring round Mount Karol

Salogra (1500) to Kandaghat (1420) – 7 km at -1:88

The choice of contour is determined by the next saddle to which the railway is aiming which is 80 m lower than Solan.

The northern section



Kandaghat (1420) to Kanoh (1600) – 5 km at 1:28

Here the road and the railway choose different sides of the mountain on their way up to the next saddle at Kathlighat. The latter chooses the east side in order to make use of some deep valleys which enable it to lengthen the route and lessen the gradient but this is still one of the steepest sections of the line. Fine multi-arched bridges crown the heads of these valleys, the most impressive of which is bridge 541 just before Kanoh station

Bridge No 541 near Kanoh

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Kanoh (1600) to Kathlighat (1700) – 8 km at 1:80

Road, rail and watershed all meet again at Kathlighat. (A 'ghat' is a ridge or mountain pass.)

Kathlighat (1700) to Shogi (1830) – 5 km at 1:38

Kathlighat

The road and the railway jostle for position along the narrow ridge but since there is climbing to be done, the railway first take a wide detour round a spur to the west; then crosses the ridge to the other side at Shalaghat.

Shogi (1830) to Tara Devi (1840) – 8 km level

For a while the railway runs right along the crest of the ridge aiming straight for the peak on which the temple of Tara Devi stands. To the left you can clearly see the runway of the airport at Jubbarhatti. On reaching the end of the ridge, the road veers left and the railway right. As the railway rounds the base of the mountain, magnificent views of Shimla present themselves. The third longest tunnel on the route (493 m long) brings us back to the west side of the ridge and into Tara Devi station. (The altitude given on the station name board is the height of the temple, not the height of the station.)

Shimla from near Tara Devi station

Tara Devi (1840) to Jutogh (1920) – 5 km at 1:62

Faced with the 2100 m peak of Kamna Devi right ahead, it is the turn of the road to go right and the railway left. A gradual but twisty climb brings the line up to a saddle at Jutogh station.

Jutogh (1920) to Summer Hill (2040) – 3 km at 1:25

As the train rounds the bend, the Viceregal Lodge comes into view and a bit of steep climbing brings us into the penultimate station.

Summer Hill (2040) to Shimla (2075) – 3 km at 1:86

The line skirts round observatory hill before diving into the last tunnel (which at 383 m long is the fourth longest) to emerge on the south side of the ridge into Shimla station.

Shimla station

Shimla's situation

As we have seen, Shimla sits on a sunny, south-facing ridge on the Continental Divide at an altitude of 2200 m. The gradient of the route up from Kalka, which is essentially shared by both the road and the railway, is never that steep and long before the British came, the road was part of a much longer trade route, the Hindustan-Tibet road which continues beyond Shimla through Fagu and Theog to Narkanda at 2700 m where it descends off the Continental Divide into the valley of the Sutlej river at a height of 800 m. It then follows the river deep into the high Himalayas to a height of 2700 m at the foot of the Shipki La pass whose summit at the Tibetan border lies at 3900 m. This border is, of course, closed as much of the Indo-chinese border territory is in dispute.

In short, Shimla is the first place on the well-trodden Tibetan trade route which reaches the magic 2000 m mark. Solan is not high enough and there seemed little reason to go any further to, for example, Theog which was already a thriving market town surrounded by heavily cultivated orchards and terraces. In Shimla, the British found enough flat land on the top of the ridge, cool breezes from all directions and shady pine forests in which to wander and have their picnics.

November 2013