

At the second mile the rise is 18 feet where the line begins to rise on to the Isthmus at the rate of 75 feet per mile, for two miles, on which the excavations in rock and earth would be heavy. Thence across the plateau to the 8th mile, the gradients are easy and the works would be light.

At 8½ miles the altitude is 293 feet, thence the line runs on the steep slopes of a rocky hillside to the 24th mile with variable gradients, the highest being 1 per 100 or 528 feet per mile.

From 8th to the 21st mile the works would be very heavy, consisting of deep rock excavations and the bridging of a number of deep valleys and chasms in the rocks varying from 75 to over 200 feet in depth, of which the following is an example:—Depth, 160 feet; width at top, 500 feet; at bottom, 30 feet.

The first trial line was run near the edge of the water, by which a great part of the heavy bridging would be avoided; but the rock excavation would not be reduced. The alignment is not good and there would be a gradient of 60 to 70 feet per mile in getting down to the head of the inlet, which would be a serious obstacle against heavy coal traffic.

At the 24th mile the altitude is 120 feet, thence to the 27th mile the rise is 180 feet per mile; but these steep gradients would be in favor of heavy traffic from the north.

From this point the line descends gradually to the head of Cowichan Bay, the maximum gradient being 1 per 100, of which there are two lengths, making an aggregate of 2½ miles.

The valley of Kokashilah is crossed near the 32nd mile; it is 85 feet deep, 500 feet wide at the top, and 120 feet at the bottom.

At 34½ miles Kilvin Creek is crossed. The valley is 900 feet wide and 40 feet deep. The creek is 150 feet wide.

At 36½ miles Cowichan River is crossed. The valley is 800 feet wide and 35 feet deep; the water way 500 feet wide.

The works from the 24th to the 34th mile would be moderate, thence to the 37th mile they would be rather heavy.

#### *Second Division.—Cowichan River to Nanaimo.*

From Cowichan River the line follows a depression behind the rocky hills that line the shore of the strait. It crosses Chemaines River near the 45th mile and comes within a quarter of a mile of Horse Shoe Bay, between the 47th and 48th mile; thence it follows the shore pretty closely up to the head of Oyster Harbor at 61½ miles.

From this point the line follows a low undulating country, crossing the Nanaimo River near the 2nd mile, the River Chase at 66½ miles, and it reaches Nanaimo Harbor at 68½ miles from Esquimalt.

There is a great deal of curvature throughout the whole length; but the curves are not sharp.

#### *Gradients and Character of the Work.*

The gradients on this division are generally easy, the maximum being a few short lengths of 1 per 100.

The work from the 37th to the 42nd mile will be heavy, the excavations being generally in gravel or clay loam, with a few short rocky spurs underlying. On the next two miles rocks prevails and the works would be rather heavy.

The Chemaines Valley near the 45th mile is 130 feet deep; 120 feet wide at the bottom, and 900 feet at the top, and there would be some rather heavy cutting for half a mile beyond it.

From the 46th to the 59th mile the works will be variable, and may be classed as moderate for half the distance and the balance as rather heavy, consisting of cuttings, partly in rock, and bridging deep valleys and lagoons.