Following out the same principle in the location from Hatley Gulf to the point near the waters of Lake Massawippi, where the heavy grades on Mr. Vining's survey terminate, an additional increase of distance of at least 4,300 feet, must be encountered; assuming the proportionate increase when similar grades are avoided, to be the same as on the line submitted by the Deputation. Thus making the total increased distance to the Province Line 13,363 feet, or 2 Miles 2,863 feet. This added to the 2½ Miles, being the difference between the original line surveyed by Mr. Vining, and the Western Coaticooke route, would make the increase of distance on that portion of the road within the Province Line, 5 miles 163 feet.

With reference to the distance of the route proposed by the Deputation from the Province Line to Island Pond, no reliable information has been furnished; it was admitted, however, by Mr. Gilbert, that it would be about 20 Miles.

Assuming this statement as correct the result will show a difference against the Stanstead and Clyde routes of 4¼ Miles. Thus making a total difference in distance between the two routes of 9 Miles and 1483 feet, so far as any calculation can be made from the data furnished.

As much has been said with reference to gradients, and their effect on the future working and success of the road, I wish to institute a comparison of those on the routes under discussion. The result of the location from the point of divergence near Lennoxville to Island Pond, by the Western Coaticooke, shows the total length of 45 feet grades to be 13½ Miles.

On the route recommended by the Deputation, the length of 45 feet grade within the Province alone, (assuming their own Profile as far as shown, and taking for granted that they should succeed in reducing all the grades between the point at which the survey terminates, and the point of divergence to 45 feet) would be 17 Miles, 2240 feet, showing a difference in the extent of 45 feet grades of 4 Miles over the Western Coaticooke route.

On the portion of the route from the Province Line to Island Pond, supported by the Deputation, no reference is made to gradients, but much stress is laid on the fact that on the located line a summit is overcome of 191 feet; had the facts been laid before the Board as to the nature and extent of the continuous rise that is said to exist between Stanstead and Island Pond, following the Clyde River, a comparison as to value of gradients on each route could have been instituted, but as there are no data furnished for that purpose, it will be sufficient to state that in overcoming a summit the proper distribution of grades is the main object to be attained. The relative value of grades on a line of road does not depend wholly on their declivity; the length and proper distribution are points which must be embraced in the calculation to arrive at a correct and satisfactory result, and I could not venture a professional opinion on that subject without taking all these points into consideration, and making a careful review of the final arrangement of gradients on the entire sections of the routes under comparison.

Where a Summit is to be overcome, the admitted maxim should not be lost sight of, *viz.* "Never descend for the purpose of ascending". The existence of intermediate Summits creates ascending and descending grades, and, in proportion to the number and height of Summits, the total rise and fall are increased, and with it, the expense of working the road.

For the purpose of comparing the distribution of grades on the Western Coaticooke, with those on the Stanstead route, I give a Statement showing the total rise and fall on each:—

Total rise and fall on the Western Coaticooke route, from the point of divergence, near Lennoxville to Island Pond ... 1107 feet.