In the first place it would certainly be desirable to work the line through (especially as it is a portion of the main trunk line) without a change that would involve our having recourse to "special machinery" for the purpose. But when we consider the nature of the best section that the line of 1 in 25 gives, together with the crossing of the Conway River seven chains in length, which must from its height be a suspension bridge, and the heavy cutting through solid rock in some places to obtain 1 in 25 grade as marked upon the section, it becomes a matter of importance as to whether it would not be better to forego the desirability of the case, and consider the two routes in the light of their respective merits, before the matter is finally decided upon.

In favour of the line over the Whale's Back, it may confidently be asserted that both of the grades can be improved. In the case of the grade of 1 in 7 the ground is so favourable that without any difficulty sufficient length by curving can be had, so as to improve the grade to 1 in 15, but not to 1 in 25. The ground for the whole way would be easy of excavation, and without any chance of rock appearing, whilst the work would be of the lightest description; add to this a far better crossing of the Conway River can be had, with half the length of bridging that would be required at either of the other two crossings, a far lower bridge, and with better approaches.

I should have made a survey of this other line over the Whale's Back, but as this portion was not included in my division of the work I was not aware but that a far better line could be had along the creek. Nor did I discover this until the work was plotted in the office and I became engaged in putting the grades upon the section. But, feeling as certain as if a survey had been made that what I have above stated can be depended upon, I scarcely considered it worth while to lose the time in doing so afterwards.

The only question therefore that arises is, whether the portion of the line over the Whale's Back should be worked in a special manner, in connection with a good road-bed, easy of construction and maintenance; or whether, in dispensing with this alternative, the line should be built permanently along the Campbell Creek, with an easier grade, but over far more difficult ground, costly in construction and, comparatively speaking, difficult of maintenance, with a far greater liability to accident in working, by reason of it passing over ground that has been much ravined by the destructive agencies of rain, frost, and snow.

Considering not only the probability, but the almost certainty, of improved motive power in a few years hence, I am of opinion that the Whale's Back line would prove a far better one than the other in every respect. And speaking from long experience, as regards the necessity of constructing a line of railway over ground that will enable it to be kept in good working condition, and with the greatest economy, I certainly must give preference to the line over the Whale's Back, with its grade of 1 in 15, to be worked by special machinery until the time arrives when the mode of working our railways shall have undergone alteration and improvement.

I have shown in sketch upon the index plan the route of the line over the Whale's Back; also the grades upon the section, which must be considered as only approximate, having been copied from the section that accompanied my exploration report, which gives the heights "barometrically" taken.

In crossing the Quail Range you will perceive that two lines have been surveyed. The first of these is represented by the continuous chainage along it, which is somewhat the shortest, but passing over a high ridge, necessitating a tunnel of about 14 chains in length. The other line crosses higher up the range at the same time, at a slightly lower point than the other, and doing away with the necessity of a tunnel. Therefore, as tunnelling (especially at a place of that description) would undoubtedly be objectionable for many reasons, the alternative line in blue would, I consider, be altogether the most preferable for location, where no tunnelling will be required, and the heavy cutting free from rock. The line thence to the Charwell River passes over very favourable ground.

Division 2.

In the selection of the crossing of the Charwell River, I first surveyed a line higher up under the hills, as will be seen upon the plan, Sheet No. 1, also another crossing of the river lower down. The sections of these crossings will be found on Sheet No. 1A. Both of these crossings of the river are objectionable, by reason of the height of bridging that would be required, with an increased length of line. After considerable examination, I found the crossing that I have adopted the best that could be found, having the lowest height of bridging, with grades of 46 and 42 on the south approach to the bridge, and along a side hill with a very gentle slope and a grade of 1 in 25 on the north side. The northern approach to the bridge, with its grade of 1 in 25, has but little side hill cutting.

The first line run, as will be seen by the section, was objectionable in consequence of the depth of the cuttings, but the alternative line shown in blue for location is a very great improvement, and the ground over which it passes will insure a good firm road-bed. The line from the top of the grade of 1 in 25 will be easy of construction the whole way to the commencement of the descent from the Greenhills to the Greenburn.

The result of the survey of this part of the line has been to show that a grade of 1 in 25 is the best that can be obtained. By an inspection of the plan upon Sheet No. 4, it will be seen that a general contour survey of the hills has been made, resulting in the adoption of the red line as approximately showing the course of the line for location, and, although the section shows a grade of 1 in 19 and another of 23 at this place, yet the continuous grade of 1 in 25, as also shown upon the section, can be obtained, and on its location a section can be produced which need not show more than an average cutting of from 10 to 12 feet on the side hill, or a sufficient depth to obtain the proper width of the road-bed, as there is distance enough for the purpose, with room sufficient to enable curves of five chains radius to be laid in. The deep cutting upon the section at the end of Sheet 4 will disappear when the curve at that place is located.

The crossing of the Greenburn (like that of the Charwell River) has been chosen at the place where the dray-road crosses, as it is the only one where ground is to be had to approach the bridge at a comparatively low level. This bridge is between 20 and 30 feet higher than that over the Charwell River, but much shorter; and as there is but little water in it, even at its highest flood (by reason of