Engineer's Office, Baltimore and Ohio Rail Road,

BALTIMORE, October 1st, 1853.

WILLIAM G. HARRISON, Esq., *President:*

SIR:

In submitting my present Annual Report, I proceed to give a brief account of the circumstances which have influenced the *plan*, *construction*, and *cost* of the Road from Cumberland to Wheeling, executed under my direction as Chief Engineer.

Of the Plan of the Work.

Under this head is embraced the *location of the Line* and the *manner of its construction*,—which will be spoken of in succession.

The Location.—This is a subject of primary concern in every railway. There are difficulties connected with it upon almost every line, either in the face of the country or in the interests which interfere to divert it from its true course. Both of these classes of obstacles have embarrassed this Road, and the former in an eminent degree.

The necessity of adhering to the territory of Virginia in seeking a route to Wheeling, forced the Baltimore and Ohio Rail Road over a country of much harder features than that upon which it was originally located through Pennsylvania in 1839. The mountain summits were higher and more numerous, and the approaches to them on both sides more rugged and abrupt. After an extensive and careful system of instrumental surveys, and an appeal to the ablest professional counsel, the route previously recommended by myself was adopted, and the Road has been built upon it. It involved, in the passage of the Alleghenies, a higher grade than had been previously employed upon lines of general traffic, and hence the several questions which arose received the closest scrutiny of the Engineers called into the consultation, and whose scientific attainments and matured experience were assiduously devoted to their solution. That their decision was right, the working of the mountain grades upon this road has satisfactorily shown. That they require some increase of motive power was known and admitted beforehand, and the increased demand has not been greater than was anticipated. But on the other hand they have shortened the route

and reduced its curvatures and cost of construction to an extent which greatly preponderates in the balance of advantages. A leading objection to the use of the higher grade, its supposed dangers, has been found by two full years of experience, to be entirely groundless. So far from being more subject to accident than other more level sections of the road, they have been in fact less so, owing clearly to the greater caution observed upon them. The winter of one of these years was the unusually severe one of 1851–2, and the success with which the grades were passed through the snow and ice of that winter, must be conclusive upon this ground of apprehension. Comparing now the passage of the Allegheny by the Baltimore and Ohio Rail Road with the crossing of the same chain by the two other principal lines in Pennsylvania and Virginia, we find upon the former a grade of 95, and upon the latter one of 105 feet per mile, approaching respectively within 11 and 21 feet of the grade of this Road. It is true that the Pittsburg and Connellsville Road, a branch of our own, will have a grade of 66 feet, if they see fit to lose 10 miles of distance to obtain it, and so might the Baltimore and Ohio, and the Pennsylvania and Virginia Roads have passed the mountain upon that or even a lower grade, if the Engineers who have located these roads had deemed it better to develope their lines by winding around the spurs of the ridges, in order to secure a more gentle inclination at the expense of a vast increase of distance, curvature and cost.

The grades of the Baltimore and Ohio Rail Road present one feature somewhat more marked than those of its competitors for the Western trade—but that is confined to the central 60 of its route of 380 miles. As a system, its grades are at least as good as those of its rivals, being as well or better adapted to an economical application of assistant power, and, having the advantage of them in the best steam generating fuel of the country, in inexhaustible supply at the foot of its steepest ascents.

I have touched upon this subject the rather as it appears to be still, to some extent, an occasion of reproach to this great work and of invidious comparison of it with other lines, which, whatever may be their merits and their importance to Baltimore or to other cities competing with her for the Western trade, and severally boasting that they possess the best pass over the great Allegheny barrier, can none of them compare with the Baltimore and Ohio Rail Road in directness of connection, through her Parkersburg arm, with the commercial centres of the Mississippi valley.

The Manner of Construction.

In form, dimensions, and material, the work has been designed with a view to ample accommodation and the utmost stability and permanence.

The breadth of Road-bed is for two tracks throughout the line