have frequent occasion to make, is, to determine the proper elevation to be given to the outer rail of a railroad track, in order to give the same relative pressure upon the two rails upon the curved, as upon the straight portions of the road.

This will depend, of course, upon the speed of the train, and the radius of curvature. The speed being variable, the elevation can only be perfectly adapted for each radius, to a particular rate of speed, which should, probably, rather be above than below the medium speed of trains.

Now, it will readily be seen, that the line of the resultant of the centrifugal and gravitating forces, passing from the centre of gravity of the moving mass, should meet the plane of the two rails at right angles, and at the same point at which the vertical from said centre of gravity, would meet that plane if it were level, as when the line is straight; a condition manifestly requiring the outer rail to be elevated above the inner one, by an amount \( u \), having the same ratio to the distance between centres of rails, that the centrifugal force due to the given velocity and radius, has to the resultant of the centrifugal and gravitating forces. Then, if we construct a right angled triangle upon a horizontal base \( b \), making the vertical, \( (u) : b : \) hypothenuse, \( (h) : \) centrifugal force, \( \frac{v^2w}{gR} : \) weight, \( (w) : \) resultant, and having \( h \) equal to distance between centres of rails, the length of the vertical \( (u) \), shows us the elevation required.

To deduce the value of \( u \), we have from the above, (premising that \( b = \sqrt{h^2 - v^2} \)) the proportion \( u : \sqrt{h^2 - v^2} \):

\[
\frac{\frac{v^2w}{gK}}{w} : \frac{v^2}{gK} : 1,
\]

whence \( u = \frac{\frac{v^2}{gK} \sqrt{h^2 - v^2}}{gK} \), which is readily resolved into \( u = \frac{hv^2}{\sqrt{v^2 + g^2K^2}} \), in which we have the value of \( u \) in known terms. This constitutes the solution of our problem.