

open canal $1\frac{1}{4}$ miles, therefore the virtual saving of distance produced by the tunnel route, when equated by the average loss of time is, 5 miles minus $1\frac{1}{4}$ miles or $3\frac{3}{4}$ miles* saved in effect.

Such are the theoretical results upon a fixed hypothesis, that establish the limits of this subject, which of course in practice will be modified by many causes; and I will now dismiss the matter with the observation, that, though the deductions in this connexion, might be both more briefly and vigorously developed by mathematical formula, yet I have preferred the more familiar explanations given above as best suited to the present purpose.

The drawings, I have sketched to accompany this report, and elucidate the condition of affairs at the tunnel, such will be found at the end, are

Fig. 1. Exhibiting a longitudinal section displaying the present state of the tunnel excavation.

Fig. 2. Exhibiting a section of the finished excavation of the tunnel.

Fig. 3. Exhibiting the tunnel with its arch and tow-path complete.

In the heavy deep cut in "Athy's hollow," adjoining the northern portal of the tunnel some very formidable slides of rock have occurred within the past year, and others are threatened which will enhance both the cost and difficulty of this part of the work.

The 66th level terminates at the lower end of this cut and in the ravine called "Athy's hollow" into which it opens, are located four locks of 10 feet lift each, separated by pools of 80 feet surface and 400 feet clear length; by this 40 feet of lockage in a distance of 1638 feet we descend to the 61st level, upon which it has been proposed to introduce a feeder which I shall notice hereafter.

The 40 feet of lockage in "Athy's Hollow," to which nothing has yet been done, is the heaviest and most backward masonry upon the line, or that which will require the longest time to complete it. These locks are attended with several difficulties: suitable stone is difficult of access; the quarry will be remote from the work; the ravine, in which the locks are located, is so narrow, as to furnish very little room for a stone

*Strictly the virtual saving would be a little less, owing to the greater speed upon the open canal.