Observations on the present mode of executing Railways, with suggestions for a more economical, yet equally efficient system, of both executing and working them. By FRANCIS WISHAW, M. Inst. C. E.

The author at the commencement of this paper alludes to the principal causes of the great differences between the original estimate and cost of railways. Among these he enumerates the imperfect knowledge of the strata, which occasions the cuttings and embankments to be formed with slopes, which are dangerous, and add to their cost—the imperfect formation of the embankments, especially in clayey soils, which in the opinion of the author ought to be carried up in layers or courses of from $1\frac{1}{2}$ to 2 yards in thickness, sufficient time being allowed for subsidence before the next layer is added—the cost of stations, which in some of the great lines forms a considerable proportion of the whole cost.

The author then proceeds to suggest means for effecting a considerable saving in the original cost of railways, a certain method of preventing accidents by collision, a saving in the annual expenditure, and a better adaptation of the locomotive engine to its work.

With these views, he proposes a single line of rails—that the line should be divided with intermediate engine stations, three on the London and Birmingham for instance, the engines at each being suited to the prevailing gradient of the district. Thus a line of railway may be more easily laid out, as one or two unfavourable inclines will not affect the working of the whole. At each station there must be a small portion of an additional line of rails, and also at other convenient intervals. The mode of working such line is as follows:—Engines are to start simultaneously in each direction from the terminal and intermediate stations. These engines will pass each other at one of the portions of the double line, and the engine being reversed and taking the other train, will return to the station from whence it started, when another exchange of trains takes place. Thus there is a regular interchange of loads throughout the day, and each engine is confined to its own portion of the line, and it is impossible that a collision can take place. Equal accommodation would be afforded to the public, and the engine man, from being always confined to the same small portion of the line, would be perfectly conversant with every part of it. The saving which would on this system be effected on the original cost is estimated at more than £5000 per mile.

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On the Marquis of Tweeddale's Patent Brick and Tile Machine. By MR. G. COTTAM.

The first process by this machine is to make a continuous sheet of well-pressed clay, of the proper breadth and thickness. This is then cut into the required lengths. It moulds at the rate of 24 bricks per minute, or 1,440 per hour, and, in a brick-maker's day of 16 hours would produce 23,040 per day; and, in consequence of the compression which the clay undergoes, the bricks do not require one-third of the time to dry them that the hand-made bricks do. The tile machine is a modification of that of bricks. In each case, the clay is made to pass between two rollers, from whence it is brought out in a thin flat cake, and is cut to the requisite width by two wires. It is then conveyed, by an endless web, under other rollers, and, by a simple contrivance, the tiles are cut to the required size, the web farther conveying them on to the shelves from whence they are taken to be burnt. By a modification of the