

gested themselves,—the boiler-power was insufficient, the inner machinery too crowded and inaccessible, and the connecting-rods, working at too great an angle, by an irregular, impulsive movement, diminished the adhesion of the horizontal wheels. The improvements were made and further experiments conducted with special reference to the requirements of the Italian Government, which included three trains a day each way, the mail train to perform the journey at an average rate of twelve miles an hour, including stoppages, the speed up the steepest incline being seven and a half miles an hour, while the gross weight of the train was to be sixteen tons. The mixed and goods trains were to carry forty and forty-eight tons each, with two engines. The traffic on these trains represented a return of £100,000 annually. The writer described the official trials in Italy in the presence of the representatives of the English, Italian, Russian, and Austrian Governments. The result of the trials exceeded the estimate both as to speed and weight of the trains, and Captain Tyler, who represented the Board of Trade, reported "that this scheme for crossing Mont Cenis is, in my opinion, practicable, both mechanically and commercially, and that the passage of the mountain may thus be effected, not only with greater speed, certainty, and convenience, but also with greater safety, under the present arrangements..... There is no difficulty in so applying and securing that middle-rail, and making it virtually one continuous bar, as to preclude the possibility of accident from its weakness or from the failure of its fastenings; and the only question to my mind is whether it would not be desirable still further to extend its application to gradients less steep than one in twenty-four, with a view to greater security, especially on curved portions of the line." Similar favorable reports were quoted from the French Imperial Commissioner, while it was stated that those of the Italian, Russian, and Austrian Commissioners were equally favorable and conclusive. In November and December last, the French and Italian Governments granted concessions, authorising the railway on the Imperial postal road over Mont Cenis with a width of about thirteen English feet; and a company has since been formed to carry out the undertaking. The works were commenced in March, and the line is expected to open in May next.

Attention was directed at some length to the conditions essential to the success of the system, the first of which was the employment of different types of engines, according to the heaviness of the gradients; of each of which full descriptions were given, with the aid of colored diagrams. The carriages, as well as the engines, are each furnished with four horizontal wheels, which have flanges underlapping the centre-rail. These act both as guide and safety wheels, preventing the carriages from leaving the rails, and, by guiding them round the curves, greatly diminish the frictional resistance and the tractive power required, thereby rendering it easy to reduce the weight of the engine to that which was necessary for producing and carrying the power required for the traction of the train. The economy of weight has been effected by a simpler arrangement of the machinery, and by using an improved quality of material. For the making of mountain lines, which are exposed at certain seasons to an unfavorable climate, from the effects of snow, frost, and fogs, it was desirable to devise some means of cleaning the surface of the rails, and for improving the state of adhesion as the trains advanced, so as to dispense with the use of sand. This might be done at speeds from five to ten miles an hour; ice and snow might be cleared off by cutters attached to the engine; and, in seasons of mist, new machinery could be probably contrived for removing that almost imperceptible film of mist which diminishes the adhesion to nearly the same extent as ice. The adhesion was best in the winter, when the snow remained for months in a state of dry powder; but the places where it accumulated were protected by covered ways, and the rails were always in good condition.

He said that the centre-railway system was never intended to be worked on any except the steepest inclines, where no other

engines could work. It would be only necessary to have a covered way for fourteen kilometres, which would cost £40,000. One kilometre in the avalanche district, which was well known, would have to be protected by stone; but the remainder could be protected by wood, which was amply strong enough to resist the weight of from twenty to thirty feet of accumulated snow.—*Reader.*

Charles Dickens on Life Insurance.

When a civil engineer makes a profile drawing of the various "cuts," fillings, embankments, &c., of the work to be done within any particular division of some proposed railroad, he leaves out all the perfectly level spaces, and merely indicates their existence by figures placed at points where these long plains begin and end. Thus, if with a profile on a scale of two feet to the mile, he finds that sixteen inches of that will be drawn on his profile in perfectly horizontal lines, he leaves out the sixteen inches of plain, bringing the two nearest hills together, and where their outlines join, places a figure indicating the length of the plain to be inserted between the two; not only this, but all the inclined lines are made steeper in a certain proportion, thus compressing the profile that would otherwise occupy a space of twenty four inches into less than eight. This is technically called "exaggeration."

The style of exaggeration is exactly what Dickens and every other good novelist does in his profile of society. He leaves out all of the dead level people, in whose characters there is nothing that rises above or falls below the common plain. His characters have always some salient peculiarity. As in the engineer's profile, though the hills do not rise higher than the actual measurement, so in Dickens' characters, though they never exceed in grotesqueness what has been witnessed in actual life, the perpendicularizing of the lines and the grouping of all these prominences together, and the leaving out all the intervening platitudes of nature and humanity, make them seem like groups of grotesque, lop-sided cliffs in the one, and as grotesque, lop-sided men in the other.

Following out the principle, Mr. Dickens seizes not only upon the salient points of individual character, but also upon social peculiarities, and one after another has presented to the public, in this form of "truthful exaggeration," almost every institution of the present social system for condemnation or praise.

Life insurance seems to have arrested his attention, as one of the interposing features of civilized society, and as one in which are originated many strange, romantic, and tender, as well as many of the most selfish and diabolical human acts.

Two life insurance stories have appeared at different times in "All the Year Round," "Hunted Down," and lately, "Thomas Griffith Wainwright, the Poisoner." To both of these stories Mr. Dickens' name appears as the author. The last mentioned one, which was republished in "Every Saturday," for February 9th, was, no doubt, elicited by the popularity which the thrilling interest of the first one rendered so popular. The style of this last story is nothing like so readable as the former, and we are strongly inclined to doubt its claims to such celebrated paternity. Its appearance in "All the Year Round" seems to warrant the assumption that the illustrious novelist may have acted as a godfather to the bantling of some young writer; but with such a splendid plot it is a disparagement to the genius of Dickens to suppose that he would not have made more out of it.

In these two stories the dark side of life insurance is presented to the public view. In each a young and trusting woman's life is destroyed slowly and with devilish blandishments, in order that the human vampire who accomplishes it may get the money on the policy. The idea is one of such horrible interest that most of the readers will doubtless regard it as one of those that find a place in a fiction alone. But it is pretty well understood that Dickens never takes his starting point for a story from the ideal alone. Everything that he has written has been found at last to have a foundation in fact, and, like the civil engineer, he