ceeds the fragments of rock being swept back by the current.

They will carry a double set of breaks to give perfect security. There is, however, only one part in which the gradients are steep enough to be of importance, that is, between the city station and the river, where the up line rises at 1 in 30, and the down line falls at 1 in 15. At other parts the line is practically level. A train will weigh about 20 tons gross, against 165 on the Metropolitan Railway; and of this, seven tons, or thirty-five per cent., will be passengers, against 15 per cent. on the railway. After the passengers have lighted, an operation not requiring more than 20 seconds, every carriage having separate inlet and outlet doors, the train will get away very rapidly, as the motive power will not have to start from a state of rest, and will be capable of exerting a greater tractive power, in proportion to the weight of the train, than ordinary locomotives. At the terminal stations both lines will converge unto a single track, and the trains will scarcely be detained longer than at the intermediate stations.

The cost of the new subway is estimated at £550,000, including land, buildings, stations and rolling stock; not a great sum for a railway, but yet many times larger than would be required for an equivalent tramway.

In conclusion we may state that the consulting engineer is Sir John Fowler; the engineer-in-chief Mr. J. H. Greathead, of 8 Victoria Chambers, Westminster: the resident engineer, Mr. W. J. McCleary; while the contractor is Mr. Edmund Gabbutt, of Liverpool."

I have often been asked, and the question has often arisen, whether any such sub-ways have been built before. In answer to that question I produce this plan of London showing the sub-ways under the Thames, and it will be seen that the matter is dealt with in *Engineering*, by Sir John Fowler, a well-known authority.

HON. MR. BOTSFORD—The first in England.

HON. MR. HOWLAN—It does not surprise me that this project is pooh poohed at and found fault with by some as a matter properly outside of what might be called practical politics, but I think after the facts have been proven, under the authority of such a man as Sir John Fowler, that such works have been built, we might properly come to the conclusion to err in very good company, as I will show in a very short time. One question which has generally been brought up is this, that owing to the great distance across these Straits it would be impossible to have a successful tunnel, the difficulty of ventilating it being so great. We know that there are several tunnels longer than this which have been successfully ventilated and on this question all the engineers who have examined the place and charts have agreed that in this matter of ventilation as well as the material of which the bottom is composed, nature has done everything—in other words, no amount of money that could be placed in the hands of a competent engineer could arrange the winds, the material at the bottom and the shores better for the purpose of securing good ventilation. It is said that while a tunnel constructed through a mountain above the water can be kept dry, necessarily there is an amount of dampness in a tunnel under water which must sooner or later destroy the work. We have evidence which does not bear out that impression. We have instances of tunnels all under water which are nearly as long as this projected sub-way. For instance if the banks of Northumberland Straits were as steep as the sides of this chamber, so that a vessel could run its bowsprit against them, it would be difficult to procure ventilation, but for a mile from the shore on each side of the Straits, the water is not more than six feet deep, and at two miles out it is only thirty feet deep. We know therefore that in such shallow water an embankment could be built for three-quarters of a mile on each side reducing the section to be ventilated to five miles, which is not a great distance, if we are to judge from results in other similar works. I have here an extract from the Cardiff *Mail* describing the tunnel under the Severn recently built, descriptions of which have appeared in many of the newspapers of England. The extract from the *Mail* is as follows:—

STEAMING UNDER THE SEA.

The Severn Railway Tunnel as Compared with other Great Bores.

The first passenger train passed through the gigantic tube linking the shores of Monmouthshire and Gloucestershire. Before those on board quite knew where they were a shrill whistle, a sudden darkening—for it