

On the Liverpool line the increasing weights of engines and speed of travelling soon necessitated a more substantial roadway, and led to the ultimate relaying, in successive portions, of the entire road, first with rails of 50 lbs., then of 62 lbs., afterwards of 72 lbs., and finally of the still heavier type now in use, made latterly of steel instead of iron.

The fish-bellied form was superseded at an early period by a rail of uniform section throughout, an improvement resulting partly from the experience of a sample piece of the line so laid, and partly from the conclusions arrived at by Mr. Robert Stephenson in determining the form to be adopted for the London and Birmingham Railway, after an exhaustive inquiry, conducted by the late Professor Barlow, at the instance of the Board of Directors of that railway.

Mr. Locke had elected to adopt a similar form of rail for the Grand Junction Railway, and to lay the entire line on wooden sleepers. Since then stone blocks have been almost universally abandoned, as it was seen that, although wood was of a perishable nature, its elasticity, and the facility which it afforded for repairs, materially diminished the cost of maintenance, and contributed greatly to relieve the rolling-stock from the shocks and jars it encountered in passing over a rigid road.

The same considerations led to the general adoption of the compressed wood key in preference to the iron key, for securing the rail to the chair.

These variations, together with the subsequent application of fishing the joints of the rails, and the substitution of steel for iron, are embodied in, and constitute the accepted practice of, the present day.

Cast-iron sleepers have been used somewhat extensively on foreign lines, but it is not improbable that ere long steel sleepers may take the place of these as well as of wooden ones, and we already see such coming into use on several of our leading Trunk lines in England as well as on the continent, whilst large quantities are exported to India, where, in addition to their other qualities, they afford exemption from the attacks and ravages of the white ant. The ingenuity of our mechanics is being successfully directed to the devising of simple and effective means of securing the rails to such sleepers.

Generally the substitution of steel for iron rails has been attended with most beneficial results to all railway companies, a change which was rendered possible by the inventions of Sir Henry Bessemer, and of the late Sir William Siemens, and by the keen