

perfect plane of perfect stability. 2°. That it should be adapted to prevent, or to neutralize, the vibrations, arising from the impact of imperfect cylinders rolling on imperfect planes. 3°. That it should possess the greatest durability and the greatest facility of being repaired, which are compatible with the above conditions.

Mr. Reynolds proposes continuous trough-shaped cast iron bearers, having rectangular bearing surfaces, the angular point being downwards. Thus a section of the bearing part of the rail across its length is a right angle, with its vertex downwards. By this peculiar shape, the sustaining area is increased, a greater resistance to vertical pressure is consequently obtained, and the lateral stability of the rail is secured. The rails are to be laid in earth, ashes, or broken stone and gravel, and the sustaining surface of the earth may have any requisite density communicated to it, by rolling, or beating the earth at the sides, so as to give it sufficient density to resist the pressure to which the rail is to be subjected. The mass being composed of materials which will not readily yield, or slip away, will be incapable of further condensation, by any subsequent pressure, not exceeding that to which it had been originally subjected by the bearers, or rollers acting at the sides.

The rails used by Mr. Reynolds are of two kinds; rails wholly of cast iron, cast in one piece, and rails either of wrought, or cast iron, laid on a cill of wood; the wood being placed in a cast iron bearer of the shape already described. The rails, cills, and bearers, in this latter construction, break joint with each other, and are held together by bolts passing through all three. Thus one continuous structure is formed throughout the whole line, and the fracture of the three parts in the same place is highly improbable. The vibrations will be neutralized by the cill of wood acting as a partially elastic cushion, in receiving the concussion to which the rails are subjected. This latter mode of construction is considered preferable, as admitting of the use of either cast, or wrought iron rails.

February 21, 1837.

BRYAN DONKIN, V.P., in the Chair.

The construction of Railways on the principle of continuous Railways bearing, as adopted by Mr. Reynolds, and described in his paper read at the last meeting, was discussed. Some of the rails and bearers cast in a single piece, having been laid on Chatmoss, inquiries were made as to how they had answered. It was stated that they were kept in order with less trouble than the others, and that they did not

exhibit any tendency to sink. It was intended to use the commonest timber for the cills; the wood having been boiled and allowed to cool in tar, became so saturated with it, that it would not subsequently imbibe any moisture.

“A Steam Expansion Table.” By George Edwards, M. Inst. C.E.

Steam
Table.

In the paper explanatory of this table, the Author remarks, that it has become a matter of interesting inquiry, why the expansive property of steam is as yet so little used, when attention has been so much directed to it, by economizing fuel by improved boilers, and other similar means; and the more so, as patents were taken out by Hornblower in 1781, by Watt in 1782, and by Woolf in 1804, for working steam expansively. The objections to the use of high pressure steam may perhaps be an obstacle, but there are many cases, as in the engines of tug-boats, to which these objections cannot apply.

Very incorrect notions having existed of the expansive properties of steam, the Author has, according to the admitted law, “that (the temperature being constant) the bulk is inversely as the pressure,” constructed a table, showing at one view, the resulting pressure, on the expansion of a given volume of steam of given density, and vice versa.

The Author then describes the construction and method of using the table, so as to answer at once questions similar to the following: “Required, the pressure of 50 lbs. steam when expanded to three times its volume?”

“In a high-pressure engine, working expansively, required the length of the stroke at which to cut off the steam, that the pressure may be 14 lbs. at the end of the stroke?”

“In a Woolf’s engine, working 54 lbs. steam, required the capacity of the larger cylinder, the smaller being unity, so that the pressure of the steam shall be 4 lbs. on the completion of the stroke of the large piston?” &c. &c.

With respect to the principle on which this table was calculated, it was stated, that the temperature did not remain constant, and that the pressure fell off most rapidly on the steam being cut off, and reference was made to some experiments made by Mr. John Taylor on this subject, and mentioned at the meetings of March 1st and 8th, 1836.
