THE IRON WAYS, BRIDGES, RAILS & ROLLING STOCK, CHEAP TRANSIT COMBINED WITH STEAM FARMING, OR, AGRICULTURE SELF-PROTECTED, PP. 1-42

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ANONYMOUS

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Trieste

THE IRON WAYS,

BRIDGES, RAILS & ROLLING STOCK,

CHEAP TRANSIT

COMBINED WITH

STEAM FARMING,

OR,

AGRICULTURE SELF-PROTECTED.

BY A PRACTICIAN.

"He would fain keep a hold on the Actual, knit the New securely to it, and give to them both conjointly a fresh direction."

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PREFACE.

In reprinting this article from the *Westminster Review*, it seems to us desirable to place briefly before the reader the mechanical, commercial, and moral conditions essential to the prosperity of railways.

Mechanically.

1. That the drainage be efficient, and the substructure firm.

2. That the sleepers, whether of wood, or stone, or metal, should possess sufficient bearing surface to prevent their crushing into the ballast beneath the rolling loads.

3. That the surface-bearing of the rails on the sleepers should be as continued and extended as practicable.

4. That the rails should be of such a section in vertical depth, that the maximum load on them may not induce deflection.

5. That the rails should be of a width proportioned to the loads rolling over them, increasing the breadth as the load increases, on the same principle that a broad wheel is used with a heavy wagon on a highway. And that in case it

be found advantageous to run very heavy engines, the upper surface of the rails should be steeled, to resist abrasion.

6. That the joints of the rails should be so secured as to be immoveable beneath the rolling loads, yet permitting free expansion and contraction, so that there be no deflection, but an equable surface throughout.

7. That on curves the rails should be bent by a machine, so as to prevent the occurrence of tangential lines and sinuosities.

8. That the maximum weight on the wheel tyres of the engines and carriages should be considerably within the limit tending to produce deflection or abrasion of the rails, or crushing of the sleepers or substructure, or the treading out of the tyres. Neglect of this causes enormous waste of steam power.

9. That the construction of the engine should be so arranged as to keep the centre of gravity low, and the base extended, in order to prevent mischievous and dangerous oscillation.

10. That the carriages and the wagons should be made as long and as wide as the curves and the width of the railway will permit, in order to prevent oscillation, and to economise space, material, and labour in working.

11. That each carriage or wagon should maintain steadiness by its length, without trammeling the wheels, which should be free to move laterally, to suit the curves or inequalities of the rails, and avoid friction.

12. That the wheel tyres should be made of dense iron or of steel, so as not to be subject to wear, and that they should be kept as light as may be consistent with strength, in order to diminish centrifugal action. That the section

of the tyres should be such as to permit their application to the wheels by pressure, without heating and cooling, and that the fastenings should not require the piercing of holes through the tread of the tyre, which is a source of great risk. That the wheels should be solid discs of timber or of plate iron, in order at all times to preserve a true circular form, and prevent the fanning action produced by open spokes at high speeds, which helps to waste steam power and retard the train.

13. That the wheels should be free to revolve on the axle, and the axle in the boxes, permitting four movements, thus ensuring the minimum of friction, and diminishing the chance of heating. That the lubrication of the axles in the boxes should be ensured by their revolving in a bath of grease or oil, in constant contact with the lower side.

14. That the springs should be thoroughly flexible and elastic, to prevent all blows or shocks between the carriages and the rails; and that the wheels under each carriage should be sufficiently numerous to prevent any injurious oscillation from acting on a single spring.

15. That the breaks applied to retard the carriages and trains should not so act on the wheels, as to make the wheels sledge or slide on the rails, but that the retarding force necessary to absorb the momentum should be produced by friction between the breaks and the rails directly, thus to prevent the rails from being destroyed at the joints and driven out of the chairs or attachments. Stations should be on elevations, to facilitate starting with little steam pressure, and stopping with little use of the breaks.

16. That every separate carriage and wagon should be provided with traction and buffer springs to prevent snatches and concussions in starting and stopping.

17. That trains ought never to be increased in the number of carriages or wagons, so as to require enormous traction and buffer springs.

18. That the whole of the rolling structures should be as light as may be consistent with strength.

19. That no carriage or wagon should have a greater load on a pair of wheels than is placed on the driving wheels of the engine.

20. That Tank engines of very large size, used without Tenders for fuel and water, should not be permitted, being more mischievous to the road than the Tender engines. The Tender was originally a contrivance to relieve small engines of their weight. To add the weight to engines already too heavy, is a most wasteful contrivance.

Commercially.

1. The more frequent the trains the better the public will be served.

2. Light engines and trains, *i. e.*, small engines and large carriages, can be worked more economically than larger engines and long trains.

3. The same principle applies to light goods, viz., frequent despatches and fast travelling, precisely as the town-carriers now work their traffic.

4. All kind of man-handling of goods wagons is wasteful. Long and large wagons should be drawn by engine power into stations under sheds, with alternate lines of rails and ordinary highways, and discharged by cranes like

canal boats. Short wagons, man-handled, are very expensive railway stock.

5. Short lines in the environs of towns, should be worked by small five minutes' trains, like omnibusses. Passengers do not object to wait for the next train when the trains are in quick succession.

6. That highways may, in many cases, be advantageously laid down with rails for horse transit, on the same gauge, to communicate with branches or main lines of railway.

7. That landowners may, with great advantage, construct cheap lines through their own estates, on which to place their farms.

8. That in many cases it would be for their advantage to *give* the land needful to construct lines of railway.

9. That when the traffic of both goods and passengers is desired in maximum, the true mode is to make two lines for passengers and fast traffic, and a third line for goods and slow traffic, and to provide also a parallel line of highway close to it. The North Woolwich Branch of the Eastern Counties line is a sample of this. Being obliged, by Act of Parliament, to make a parallel highway, the Directors are precluded from charging too high prices, and streets of houses are gradually accumulating. At no great distance of time this line will be a railway through a town on the same level. Future towns will be thus constructed.

For the accommodation of the wealthier classes, willing to pay for speed and accommodation, it would be desirable to institute *Subscription Trains* of great lightness and speed, carrying, say seventy to one hundred first-class passengers, with light luggage, and accommodation for a few servants.

A train of this kind, consisting of an engine and tender