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ADVANTAGES OP RAILROADS OVER CANALS

These considerations place in a conspicuous point of view the advantages which transport by steam-engines on rail-roads possesses over the means of carriage furnished by inland navigation. The moving power has in each case to overcome the inertia of the load; but the resistance on the road, instead of increasing as in the canal in a faster proportion than the velocity, does not increase at all. The friction of a carriage on a railroad moving sixty miles an hour would not be greater than if it moved but one mile an hour, while the resistance in a river or canal, were such a motion possible, would be multiplied 3,600 times. In propelling a carriage on a level rail-road the expenditure of power will not be in a greater ration than that of the increase of speed, and therefore the cost will maintain a proportion with the useful effect; whereas, in moving a boat on a canal or river, every increase of speed or of useful effect, entails an enormously increased consumption of the moving principle.

But we have here supposed that the same means may be resorted to for propelling boats on a canal and carriages on a railroad. It does not, however, appear hitherto that this is practicable. Impediments to the use of steam on canal have hitherto, except in rare instances, impeded its application on them; and we are forced to resort to animal power to propel the boats. We have here another immense disadvantage to encounter, the expenditure of animal strength takes place in a far greater proportion than the increase of speed. Thus, if a horse of a certain strength is barely able to transport a given load ten miles a day for a continuance, two horses of the same strength will be altogether insufficient to transport the same load twenty miles a day. To accomplish that, a much greater number of similar horses would be requisite. If a still greater speed be attempted, the number of horses necessary to accomplish it would be increased in a prodigiously rapid proportion. This will be evident if the extreme case be considered, viz. that there is a limit of speed which the horses under no circumstances can exceed.

The astonishment which has been excited in the public mind, by the extraordinary results recently exhibited in propelling heavy carriages by steam-engines on railroads, will subside, if those circumstances be duly considered. The moving power and the resistance are naturally compared with other moving powers and resistances to which our minds have been familiar. To the power of a steam-engine there is, in fact, no practical limit; the size of the machine and the strength of the materials excepted. This is compared with agents to whose powers nature has not only imposed a limit, but a narrow one. The strength of animals is circumscribed, and their power of speed still more so. Again, the resistance arising from friction on a road may be diminished by art without any assignable limit, nor does it sustain the least increase, to whatever extent the speed of the motion may be augmented; on the contrary, the motion of a vessel through a canal, has to encounter a resistance by increase of speed, which soon attains an amount which would defy even the force of steam itself, were it applicable to overcome it with any useful effect.-*Dr. Lardner's Cabinet Cyclopedia. Vol. XVII. Hydrostatics and Pneumatics, by Dr. Lardner.*