

**SECOND REPORT ADDRESSED TO
THE DIRECTORS AND
PROPRIETORS OF THE LONDON
AND BIRMINGHAM RAILWAY
COMPANY**

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Second Report Addressed to the Directors and Proprietors of the London and Birmingham Railway Company by Peter Barlow

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PETER BARLOW

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THE DIRECTORS AND
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SECOND REPORT

ADDRESSED TO

THE DIRECTORS AND PROPRIETORS

OF THE

LONDON AND BIRMINGHAM
RAILWAY COMPANY,

FOUNDED ON

AN INSPECTION OF, AND EXPERIMENTS MADE ON THE
LIVERPOOL AND MANCHESTER RAILWAY.

BY

PETER BARLOW, F.R.S.

COR. MEM. INST. FRANCE, OF THE IMPERIAL AND ROYAL ACADEMIES OF
PETERSBURGH AND BRUSSELS, ETC.

LONDON :

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1835.

ERRATA.

Page 44, fourth line from bottom, *for on read in.*
48, two lines from top, *for locomotion read locomotive.*

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R E P O R T
ADDRESSED TO
T H E D I R E C T O R S
OF THE
L O N D O N A N D B I R M I N G H A M R A I L W A Y
C O M P A N Y .

Introduction.

IN presenting this Second Report to the Directors and Proprietors of the London and Birmingham Railway Company, it may be well to state the resolution of the general meeting which gave rise to it.

Extract.

“RESOLVED UNANIMOUSLY—That Mr. Barlow be requested to visit the Liverpool and Manchester Railway, to view that line, and advise this Board as to the weight of rails, the description of chairs and fastenings, the distance of the supports, and the size of the blocks that he would advise the Directors to adopt; and to accompany such advice with any observations generally on the subject.”

It was accordingly arranged, conformably with this resolution, that I should visit Liverpool with the Chairman, Isaac Solly, Esq., and Thomas Tooke, Esq. one of the London Directors, and there meet T. W. Rathborn, Esq., and Edward Cropper, Esq., two of the Liverpool Directors; that they should accompany me in my inspection, and while making such experiments as that inspection might render desirable;—the Liverpool and Manchester Directors, on their part, most handsomely offering every assistance and facility in their power, by placing at the disposal of the deputation the Swiftsure locomotive engine, with such carriages as might be required for our purpose, and every other accommodation we might desire.

We met, as appointed, at the Liverpool station of the Liverpool and Manchester line, and employed the first day in examining the state of the rails, chairs, and blocks, modes of fixing, and other particulars. In the course of this examination, I took the opportunity of inquiring on the spot the opinion of the resident engineers, contractors for repairs, workmen, and

others, relative to these several points ; but I was much disappointed to find those opinions, in most instances, discordant, and in many directly contradictory; a circumstance the more remarkable, as one would have thought that five years' incessant practice would have been sufficient to eradicate many early erroneous ideas.

I am not myself a practical man, but from my situation and pursuits I have been for nearly thirty years in almost constant intercourse with two of the largest and most varied mechanical establishments in the kingdom, and have, during that time, witnessed or superintended a vast number of experiments and trials on various mechanical subjects, many of which I have afterwards been enabled to examine in the works at large; I am therefore, to a certain extent, acquainted with what theory gives, and what practice requires, and the limits it prescribes; as I am also with the views and arguments of practical men, who I know sometimes, like other persons, in their anxiety to avoid one evil lose sight of other collateral evils, which their remedy increases or creates;

but I must say that I never saw this so strongly marked as on the present occasion, nor such a diversity of conflicting opinions on what appears so simple and plain a case. This is a circumstance much to be regretted, not only as regards the doubts which it naturally throws upon the mind of proprietors, embarking large amounts of capital in the undertaking, but also in respect to practical men themselves, whose judgment must suffer depreciation by such discordance. Opinions derived from long experience are exceedingly valuable, and outweigh all others, while they are consistent with facts and with each other; but they are worse than useless when they lead, as in this instance, to directly opposite conclusions.

In making these remarks, I beg to be understood as intending no disrespect to the opinions of practical men generally, but simply to show that it was impossible, in this case, for me to be guided by them; and thereby to justify the plan I soon determined to adopt, viz. to avoid, as far as possible, argument founded on mere hypothesis, and to substitute for the latter, facts

drawn from actual experiments, which should be made publicly, registered generally, and witnessed by any one interested in the decision; and moreover, as I intended to rest my report entirely on these data, I resolved to offer no opinion, till I had time to analyze and compare my results. I am not certain that this plan of proceeding was quite what the deputation most approved, but I feel convinced that it was the only way in which justice could be done to the inquiry, and confidence obtained for the decision.

Experiments.

The first and most important point which required to be decided was, the strength of iron necessary to ensure the most ample safety, at any practicable speed, with any given load and given length of bearing. The strain which any quiescent load impresses on a bar, is, I think, now well known; but what is the effect of velocity? This was one of those questions on which I found opinions greatly divided; and it is a question, perhaps, considered merely