

CONTENTS.

	Page
Introductory Remarks - - -	1
Inland Transit - - -	5
Origin of Railways — Roads of the Ancients -	8
Stone Wheel Tracks - - -	11
Railways Invented - - -	15
Cast-Iron Plate Rails - - -	17
Cast-Iron Edge Rails - - -	19
Plate Rails Improved - - -	22
Malleable Iron Plate Rails - - -	26
Wood Rails - - -	29
Cast-Iron Edge Rails - - -	31
Malleable Iron Edge Rails - - -	33
Rigidity of Malleable Iron Rails - - -	40
Different Forms of Malleable Iron Rails -	49
Setting Stone Blocks at Intervals - - -	56
Wood Sleepers - - -	62
Seating Chairs upon the Blocks - - -	66
Wedging or Keying the Rails to the Chairs -	68
Railways on Continuous Bearings - - -	70
Longitudinal Sleepers or Bearings on the Great Western	77
Continuous Bearings on Croydon Railway -	86
Flanch of the Wheel - - -	90
Carriage Axle and Bearings - - -	97
Carriage Springs - - -	100
Gauge or Width between the Rails - - -	105
Railway passing Places, Points, and Crossings	108

	Page
Danger of Lines Intersecting — Single Lines -	- 116
Turntables - - - - -	- 118
Designing a Line of Railway - - -	- 121
Principle of Railway Communication - -	- 126
Effect of Resistance of Carriages on Railways	- 131
Carriage Breaks - - - - -	- 139
Railway Gradients - - - - -	- 141
Curves on a Line of Railway - - -	- 148
Formation of the Road - - - - -	- 156
Width between the two Lines of Rails -	- 158
Width of Spaces outside the Rails - -	- 160
Width of the Roadway and Angle of Slopes -	- 163
Earth Works - - - - -	- 169
Coating of the Railway - - - - -	- 172
Drainage - - - - -	- 176
Retaining Walls - - - - -	- 179
Viaducts - - - - -	- 180
Bridges - - - - -	- 184
Tunnels - - - - -	- 189
Railway Stations - - - - -	- 195
Cost of Railways - - - - -	- 198
<hr/>	
Motive Power of the Railway - - -	- 200
Invention of the Locomotive Engine - -	- 201
Trevithick and Vivian's Locomotive Engine -	- 204
Blenkensop's Locomotive Engine - -	- 209
Chapmans' Locomotive Engine - - -	- 212
Brunton's Locomotive Engine - - -	- 214
Tindall and Bottomly's Plan - - -	- 218
Slow Progress of Invention - - -	- 219
Blacket's Experiments on Adhesion - -	- 220
Stephenson's Locomotive Engine - -	- 221
Losh and Stephenson's Patent - - -	- 226

	Page
Steam Power on Turnpike Roads - -	228
Progress of the Science of Locomotive Engines in 1825	231
Locomotive Engines as used until 1829 - -	233
Projection of the Liverpool and Manchester Railway -	238
Experiments on the Liverpool and Manchester Rail- way, 1829 - - - - -	244
Rocket Engine of G. Stephenson - -	249
Sans Pareil Engine of Hackworth - -	254
Novelty Engine of Braithwaite and Erickson -	258
Result of the Competing Experiments -	262
Opening of the Liverpool and Manchester Railway -	266
Description of the Modern Locomotive Engine -	271
Locomotive Engine Boilers - - -	281
Explosions of Steam Boilers - - -	288
Principles of Atmospheric Propulsion -	295
Atmospheric Pressure as a Motive Power -	300
Atmospheric Railway System Invented -	302
Atmospheric Railway — Kingston and Dalkey -	306
Atmospheric Railway — London and Croydon -	309
Atmospheric Railway — Pinkus and Pilbrow's Patents	321
Railway Propulsion by other Plans - -	322
Water, Compressed Air, and Air Engines -	323
The Comparative Advantages of the Atmospheric and Locomotive Systems - - -	325
Safety of the Atmospheric System considered -	329
Imperfections of the Locomotive Railway System -	337
Broad and Narrow Gauge Question considered -	339
Summary of Report of Royal Gauge Commission -	349
Difference of Opinion as to Gradients -	356

Causes of Railway Accidents - - -	361
Railway Accidents Classified - - -	364

	Page
Accidents from Mismanagement, or the Railway Administration, and from Negligence - - -	366
Accidents from Collision - - -	367
Accidents from one Train Running into another from overtaking it, or the like - - -	372
Accidents from excessive Speed - - -	382
Accidents from Negligence - - -	391
Accidents from Railway Construction, or from Defect of any Part of the Working Machinery, and from Imperfection of the Engine - - -	396
Accidents from Defects of the Engine - - -	397
Accidents from Boiler Imperfections - - -	401
Accidents from Imperfections of the Rails and Railway Curves - - - - -	402
Accidents from Imperfect Fences - - -	407
Accidents from Imperfect Earth Works and Bridges	408
Accidents from Carriage Imperfections - - -	413
Accidents from Fire - - - - -	414
Observations on Railway Carriages - - -	417
Proposals for Increase of Safety in Railway Travelling and Improvement of the Railway System - - -	423
Conclusion - - - - -	443

ERRATUM.

Page 47. The Cut should be inverted.