LIGHT RAILWAYS

 \mathbf{AT}

HOME AND ABROAD.

BY

WILLIAM HENRY COLE, M.INST.C.E. (LATE DEPUTY MANAGER, NORTH-WESTERN RAILWAY, INDIA.)

WITH PLATES AND ILLUSTRATIONS.

LONDON: CHARLES GRIFFIN & COMPANY, LIMITED, EXETER STREET, STRAND. 1899.

[All rights reserved.]

INDEX.

Austria-Hungary-

ACTS-Clauses, 161. Earlier Railway Acts framed like Canal, 11. Indian Railway, 120. Irish, 137, 138, 140, 142. Light Railways, 3, 5, 17, 25, 154-174, Appendices, VIII., IX., and X. Railway and canal traffic, 16. Railway construction facilities, 3, 154. Regulation of railways, 3, 5, 15, 154, 169. Tramways, 3, 157. Adamoli on light railways in Italy, 76. Addison on Belgian light railways, 40. Africa, South-Cape Government railways, 116. Cost, 116. Gauge, 116, 117. Rates and fares, 117. Revenue statistics, 116. Rolling-stock, 116. Agricultural depression in England. 21. Agricultural railway rates, 19. Agricultural returns for Great Britain, 21. Agricultural traction engines, 146, 151. Agriculture and light railways, 25, 28, 38, 48, 58, 64, 81, 88, 91, 100, 110, 128, 159 Agriculture, Royal Commission on, 21, 23.America-See United States, Canada. Amoretti on tramways in Italy, 79. Australia-Cost, 110, 111, 112, 113, 114, 115. Gauge, 111, 112, 115. New South Wales, 112. Queensland, 112. Revenue statistics, 110. South Australia, 111. Victoria, 114.

Cost, 90, 93. Economies, simplifications, etc., 89, 93. Financial assistance, 90, 91, 95. Gauge, 90, 94. Legislation, 89, 91. Revenue statistics, 90, 93, 95, 96. Roads utilised, 89. Axle-loads prescribed, maximum— England, 5, 154. Holland, 96. India, 182, 199, 239. Axle-loads suggested, maximum— England, 4, 157. India, 125.

BARSI Light Railway, 132, 248.

Bavarian Light Railways, 88.

Belgian Light Railways-

Agriculture and Light Railways, 28, 38, 48.

Control by State, 28, 50.

Cost, 27, 31, 41, 48, Appendix I.

Economies in working, 40.

Financial assistance, 28.

Formulæ of division of revenue, 36. Gauge, 31.

Indian lines compared, 41.

Legislation, 28, 31.

National Society, organisation of, 28.

Permanent-way, 32, 43.

Procedure for obtaining concession, 31.

Rates and fares, 37, 46.

Revenue statistics, 45, 48.

Rolling-stock, 34, 40, 243.

Roads utilised, 28, 32.

Trains, minimum number of, 36, 47. Working of lines leased, 35.

Block-working, 169.

Board of Trade a stumbling-block to Light Railway development, 25, 156, 272.

Board of Trade, Inquiries held locally, if necessary, by, 25, 172, Appendix VIII. Brazil, Appendix I. Board of Trade, Powers of-Canada, 109, Appendix I. Cheap Trains Act (1883), 169. Cape, 116, Appendix I. Light Railways Act (1896), 154-174, Easingwold, 266. 272, Appendix VIII. Railway Regulation Act (1845), 166. Geneva, 101. (1873), 168.Railways Clauses Act (1863), 164. Regulation of Railways Act (1868), 167. (below). Regulation of Railways Act (1871), Holland, 97, Appendix I. 168Regulation of Railways Act (1889), 169. Board of Trade, requirements of, 208. and IV. Statutory Rules for Ireland, 138. Light Railways made by the, 170, Italy, 82, Appendix I. New Zealand, 109. Appendix IX. Russia, Appendix I. Bosnian narrow-gauge railways, 90. Brakes, 40, 64, 81, 84, 88, 92, 146, 169, Sweden, 102, Appendix I. 220-225, 258, 268. Branch line terms offered by Government of India, 129, Appendix VII. 267. Branch to main lines and to public, benefits contributed by, 66. Break of gauge. See Transhipment. Bridges and culverts as affected by Appendix I. gauge, cost of, 180. Wisbech and Upwell, 255. Bridges and culverts, economy in, 201, Cost of service, 68. 219, 264, 267. CANADA, cheap construction in, 109. Curves, economy of sharp, 196. Canals and railways, competitive, 7, 18. Capacity of wagons. See Rolling-stock. Cape Government Railways, 116. Capital. See Revenue Statistics. Carriages, passenger. See Rollingstock. gauge, 185. Chesney on gauge, 191. Classification of goods, 13, 16. export of eggs from, 21. Colson on Considère, 66, 72. Differential rates, 14. Commission, Light Railway, 158. Commission on Agriculture, Royal, 21, 23. Commission, Railway, 15. Commission, Railway and Canal, 16. Considère's formula and views on Light Railways, 66, 71. 177. Construction, cost of. See Cost of construction. Conway-Gordon on gauge, 127, 128. Cost of construction-Australia, 110, Appendix I. 266, 266-272. Austria, 90, Appendix I. Electrical traction, 87, 109, 229-236. Barsi Light Railway, 132. Engines. See Rolling-stock.

Cost of construction-continued. Belgium, 27, 41, Appendix I. France, 27, 56, 58, 63, 65, 185, Appendix I. Germany, 85, 87, Appendix I. Great Britain. See United Kingdom Hungary, 93, Appendix I. India, 41, 119, 127, 132, 135, 136, 176, 178, 185, 201, Appendices I. Switzerland, 101, Appendix I. Three Horse-Shoes and Benwick, 264, United Kingdom, 8, 104, 220, 254, 273, Appendices I. and II. United States, 104, 107, 108, 109, Cost-of-service basis of rates, 12. Culverts. See Bridges and Culverts. Curves as affected by gauge, 177. DE BÄCKER on through booking between main and branch lines, 56, 76, De Burlet on formulæ of division, 35. De Lapparent on economy of narrow Denmark, Co-operative Association for Dimensions in India, standard, 179, 180-184, 189, 192, 198, 239, 240. EARNINGS, net. See Revenue Statistics. Earth-work as affected by gauge, cost of,

Economies in construction and working, 40, 52, 64, 65, 73, 74, 78, 81, 88, 89, 92, 96, 105, 106, 107, 109, 110, 111-115, 127, 128, 256, 259, 263-

INDEX.

England. See Great Britain. Equal-mileage basis of rates, 11. Expenditure, working. See Revenue Statistics. FARES. See Rates and Fares. Farmers and import rates, British, 18. Fencing, 52, 88, 93, 97, 111, 202, 264. Financial assistance from State or local governments-Austria-Hungary, 89-91, 91-95. Belgium, 28. France, 52, 53, 56, 58, 62. Germany, 83-87. Great Britain, 159, 160, 275, 277. Holland, 97, 98, 100. India, 118, 129. Ireland, 137, 138, 140-142. Italy, 73-76, 82. Russia, 103. Sweden, 101. Financial results. See Revenue Statistics. Formulæ determining working subsidy of lessees-Belgian, 36, 70. Colson's, 72. Considère's, 66, 71. Noblemaire's, 70. France-Agriculture and light railways, 58, 64. Analysis of railway rates, 68. Caen, Dives, and Luc-sur-Mer light railway, 63, 192. Colson's criticisms on Considère's formula, &c., 66. Considère's formula and views on utility of branch lines, 66. Control by Departments, 53, 58. Cost, 27, 56, 58, 63, 65, 185, Appendix I. Economies in construction and working, 52, 64, 65. Financial assistance from State and Departments, 52, 53, 56, 58, 62. Gauge, 53, 58. Indirect benefits of light railways discounted, 60, 63. Landes group of light railways, 65. Legislation, 52. Permanent-way, 64, 65. Pithiviers-Toury Light Railway, 64. Revenue statistics, 56, 63, 65, 227. Roads, tramways or light railways on, 52, 56, 57, 58, 62, 64, 65. Road transport preferred to tramways on roads, 62. Rolling-stock, 58, 64, 192.

France-continued. Warburton on tramways of the Charente Inférieure, 57. Working of lines leased, 54, 58. Fuel, consumption of, 78, 110, 226. GAUGE-Africa, South, 116, 117. Australia, 111, 112, 115. Austria, 90. Barry on, 4, 194. Barsi Light Railway, 131. Belgium, 31. Break of, 4, 186, 190, 194, 196. Canada, 109. Cape, 116. Chesney on, 191. Choice of, 196. Conway-Gordon on, 126, 128, 189. Cost as affected by, 177, 196. Dimensions depending on, 198. Dod on, 193. Easingwold, 253. European, 175. France, 53, 58, 63. Fuel consumption in relation to, 226. Geneva, 101. Germany, 85, 87, 88. Great Britain, 167, 175, 193, 253. Haulage and, 227. Holland, 97, 99. Hungary, 93. India, 44, 118, 125, 135, 175, 185, 189, 193. Ireland, 139, 141, 167, 175. Italy, 76, 79. Permanent-way and, 182. Rolling-stock and, 186, 191. 218, 236, 240, 273. Sweden, 102. Three Horse-Shoes and Benwick, 255. United States, 175. Wellington on, 192. Wisbech and Upwell, 255. Geneva-Cantonal control, cost, economies, fares, gauge, mileage, occupation of roads, permanent-way, revenue statistics, 100, 101. Germany-Agriculture and light railways, 88. Bavarian light railways, 88. Control by Post and Telegraph Department, 85. Cost, 87, 88, Appendix I. Economies in construction and working, 88. Financial assistance by State. Provinces, and Communes, 85,

Germany-continued. Gauge, 85, 87, 88. Legislation, 84, 85. Revenue statistics, 87, 88. Roads, occupation of, 86. Goods, general classification of, 13. Goods rates. See Rates and Fares. Goods service in England and other countries compared, 8, 10, 11, 108. Goods stock. See Rolling-stock. Great Britain-Agriculture and light railways, 25, 159, 262, 266, 270, 277, 278. Board of Trade. See Board of Trade. Cost, 8. 220, 254, 273, Appendices I. and II. Economies in construction and working, 256, 259, 263-266, 266-272. Easingwold Railway, 1, 253, 266, 268-272.Financial assistance, 159, 160, 275, 277. Gauge, 167, 175, 193, 253. Legislation, 3, 154, 156 - 174,Appendices VIII. and X. Light Railway Commissioners. See Light Railway Commissioners. Light Railways Act. See Light Railways Act (1896). Light Railways before the Act, 253-272. Light Railways since the Act, 272-278. Maximum rates and charges, 16, 17, 155, 170. Permanent-way, 256, 263, 266, 267. Railway and Canal Commissioners, 16. Rates and fares, 9-14, 16, 19, 20, 260, 269. Revenue statistics, 8, 227, 254, 259, 269, Appendix II. Roads, utilisation of, 2, 157, 256, 277. Rolling-stock, 10, 107, 236, 256, 268. Tramways Act, 3, 157. Three Horse-Shoes and Benwick (goods) line, 263-267. Wisbech and Upwell Tramway, 3, 157, 255-263. Group rates, 14. HERZEGOVINAN narrow-gauge railways, 90. Holland-Agriculture and navigable canals, 100. Control, comparative freedom from,

96, 98, 100.

Holland-continued. Cost, 97. Economies in construction and working, 96. Financial assistance by State or Provinces unusual, 97, 98. Gauge, 97, 99. Gelderland-Overijssel system, 97. Legislation, 96, 98. Light railways able to take mainline wagons, 97. Main lines and State, generous treatment by, 96, 98, 100. Permanent-way, 97. Revenue statistics, 98. Rolling-stock, 97, 99. Tramways, or light railways on roads, most important develop-ment, and classed as road undertakings, 99. Transhipment necessary between main lines and tramways, 99. Working of light railways leased by private companies to main lines, 96. Hungary. See Austria-Hungary. IMPORT rates and British farmers, 18. Imports, increase of agricultural, 21. Incremental cost of service, 66, 68. India-Agriculture and light railways, 128. Barsi Light Railway, 130, 248. Branch line terms of 1896, 129. Control, State, 118, 129. Cost, 41, 118, 127, 132, 135, 136, 176, 178, 185, 201, Appendices I. and IV. Economies in construction and working, 126, 128, 213, 226. Financial assistance, 119, 129. Fuel, consumption of, 226. Gauge, 44, 118, 119, 126, 135, 136, 175, 185, 189, 193. Guaranteed railways, 118, 119. Legislation, 120, 129, Appendix VII. Maximum and minimum rates and fares, 120, 121, 131. Permanent-way, 43, 125, 132, 198, 201. Rates and fares, 10, 46, 120, 121, 123, 130, 131, Appendices V. and VI. Revenue statistics, 45, 119, 132, 227, Appendices IV. and V. Roads, utilisation of, 122, 126, 127, 131, 248.

om, Rolling-stock, 10, 44, 184–192, 237, 239, 240, 245, 248.

India—continued. Legislation-Standard dimensions, 179, 180-184, Austria, 89. 192, 198, 239, 240. State railway system, 118. France, 52. Steam tramways, 136. Germany, 84. Interlocking. See Signalling and Interlocking. Hungary, 91. Ireland-Balfour's Railway Act, beneficial effect of lines due to, 141. Italy, 73. Baronies not granted power equal to their liabilities, 140. Cost, 138, 142. Financial assistance, 137, 138, 140, 142. Gauge, 139, 141, 167, 175. Legislation, 137, 138, 140, 142. Russia, 103. Railways Act (Ireland) 1896 compared with English Act, 142. Revenue statistics, 138. Tramways Acts, excessive cost of lines 202. under, 139. Italy-Adamoli's official report, 76. Agriculture, manufactures, and light railways, 81. 154 - 174.Amoretti on steam tramways, 79. Control of light railways as rigid as over ordinary railways, 76. Control of tramways as light as that over ordinary road traffic, 74. Cost, 82. Economies in construction and working, 73, 74, 78, 81. Financial assistance, 73, 74. 272 - 278.Fuel economy, 78. Gauge, 76, 79. Legislation, 73. Light railways and tramways distinguished, 74. Main lines, discouragement by, 76. Palermo-Corleone Railway, 77. Permanent-way, 77, 80. Rates and fares, 82. Rolling.stock, 77, 81. Tramways, or light railways on roads, 74, 75, 80. Motor cars, 146. JUNCTIONS with existing railways, 173. KENTISH hop growers and South-Eastern Railway, 18. LAND, acquisition of, 26, 31, 43, 64, Permanent-way-102, 105, 116, 130, 133, 137, 162, Australia, 111, 113, 114. 171, 177, 196, 220, 253. Barsi Light Railway, 132.

Belgium, 28, 31. Holland, 96, 98. India, 120, 129, Appendix VII. Ireland, 137, 140, 142. Light Railways Acts, 3, 140, 142, 154, 156, 253, 272, Appendix VIII. Locomotives on highways, 146, 150. Railways Acts, 3, 5, 11, 15, 137, 140, 142, 154, 162, 195, 220, 263, Appendix X. Tramways Acts, 3, 137, 157, 255. Tramroads, 3, 158. Level-crossings, 33, 40, 52, 88, 93, 106, Light Railway Commissioners-Appointment, 158. Inquiries held locally, 25. Powers under Light Railways Act, Proceedings under Light Railways Act, 272-278. Light Railways Act (1896)-Analysis, 156-174. Application, rules with respect to, Appendix IX. Commissioners, appointment of, 158. Commissioners, proceedings of, 25, Copy, Appendix VIII. Summary, 25. Light railways as distinguished from standard railways, 1, 4, 154. Light railways as distinguished from tramways, 2, 157, 255, 275. MAIN lines, relations between light railways and, 5, 31, 50, 55, 65, 66, 67, 76, 88, 90, 96, 98, 101, 103, 130, 140, 172, 173, 228. Monopoly, 14, 15. NEW SOUTH WALES. See Australia. New Zealand, 109, 110. PACKING produce, 19, 20.

Permanent-way-continued. Belgium, 32, 43. Cost of, 178, 182, 200, 220, 257, 265, 267. Dimensions, 198. Easingwold, 266. France, 64, 65. Gauge and cost of, 182. Geneva, 101. India, 43, 125, 132, 198, 201. Italy, 77, 80. New Zealand, 109, 110. Portable or "ladder" system of, 1, 64, 183, 185, 200. Sweden, 102. Three Horse-Shoes and Benwick, 263, 267. United States, 106, 108, 109. Wisbech and Upwell, 256. Portable railways. See Permanentway. Prussia, national spirit in, 84. QUEENSLAND. See Australia.

RATES and Fares-Barsi Light Railway, 131. Belgium, 37, 46. Cape, 117. Continental, 10. Easingwold, 269. England, 9. Geneva, 101. Great Eastern, 20. Great Western, 19. Hungary (average), 96. India, 10, 46, 120, 131, 133, Appendices V. (average) and VI. Italy, 82. London and North-Western, 20. London and South-Western, 20. Maximum and Minimum, 16, 120, 131, 155, 170. United States, 9, 108. Wisbech and Upwell, 260. Rates based on what traffic can bear, 12, 69. Receipts, gross. See Revenue Statistics. Revenue Statistics-Australia, 110, 114. Barsi Light Railway, 132. Belgium, 45, 48. Cape, 116. Easingwold, 269. France, 56, 63, 65, 227. Geneva, 101. Germany, 87.

Revenue Statistics-continued. Holland, 98. Hungary, 96. India, 45, 119, 132, 227, Appendices IV. and V. Ireland, 138, Appendix II. Italy, 82. New Zealand, 110. Sweden, 102. United Kingdom, 8, 227, 254, Appendix II. United States, 104, 107. Wisbech and Upwell, 259. Road locomotives, 151. Roads, light railways on, 2, 28, 32, 52, 56, 57, 58, 62, 64, 65, 74, 79, 86, 89, 98, 100, 127, 157, 180, 196, 256, 277. Road transport as an alternative, 6, 62, 144-153. Rolling-stockolling-stock—
Goods, 10, 34, 45, 64, 77, 81, 111, 116, 186, 191, 199, 219, 236-240, 242, 245, 247, 250, 251, 256, 268.
Locomotives, 8, 34, 40, 45, 58, 62, 77, 81, 101, 110, 111, 116, 132, 219, 229, 243, 252, 254, 256, 268.
Passenger, 10, 34, 45, 64, 77, 81, 101, 107, 111, 116, 186, 236-240, 243, 245, 247, 250, 251, 256, 268. Russia, 103. SAFETY regulations, 156, 169, 208. Scotland, application of Light Railways Act to, 173, Appendix VIII.

Act to, 173, Appendix VIII. Signalling and interlocking, 207. Solacroup's rule for rates, 12. South Africa, 116, 117. South Australia. See Australia. Speed, restriction of, 52, 74, 75, 84, 96, 101, 103, 154, 220, 258. State aid. See Financial Assistance. Stickney on rates, 15. Sweden, 101. Switzerland. See Geneva.

TOLLS, 11.
Traction engines, 146, 151.
Traffic formulæ. See Formulæ determining working subsidy of lessees.
Tramways and tramroads, 3.
Tramways. See Roads, Light railways on.
Transhipment, 186, 188, 190.
Treasury advances or loans, 26, 159, Appendix VIII.

INDEX.

UNDUE Preference, 16, 17, 120. United States-

Canals, roads, and railways, 104. Cheap construction of pioneer lines, 105-109.

Conditions in America and England compared, 104-107.

Economies in construction, 105, 106, 107, 109.

Electrical traction, 109, 234, 235. Gauge, 175.

United States-continued. Grants of land a valuable endowment, 105. Permanent-way, 105, 108. Private enterprise, 51, 104. Rates and fares, 9, 108.

Revenue statistics, 104, 107. Rolling-stock, 10, 107, 108, 191, 199.

VICTORIA. See Australia.