

CONTROL ON THE RAILWAYS

A STUDY IN METHODS

BY

PHILIP BURTT

FORMERLY DEPUTY-GENERAL MANAGER OF THE NORTH EASTERN RAILWAY
AUTHOR OF "THE PRINCIPAL FACTORS IN FREIGHT TRAIN OPERATING"

LONDON : GEORGE ALLEN & UNWIN LTD.
RUSKIN HOUSE, 40 MUSEUM STREET, W.C. 1

CONTENTS

	PAGE
INTRODUCTORY	15

CHAPTER I

THE MEANING OF CONTROL	17
----------------------------------	----

A large, far-reaching idea—Three new factors have enlarged our ideas of control: greater solidarity in human world; greater possibilities of co-operation; man's greater power over physical and mechanical forces—Vast size of each railway system—Competition of past era will give place to greater measure of co-operation in future—The railway system is a machine—Directing and controlling—Perceptive faculty and psychological factors—Various departmental controls on a railway system—Two main lines of control: (1) of mechanical movement, (2) of personnel.

CHAPTER II

CONTROL THROUGH ORGANISATION	32
----------------------------------------	----

Board of directors at head of railway organisation—Exercises control over policy through general manager—Diagram of organisation; various officers and their functions—Statistical assistance—Functions of British railway system defined under seven headings.

CHAPTER III

A STATION MASTER'S CONTROL	39
--------------------------------------	----

Station master acts as local agent for Superintendent—Control over personnel and over mechanical movement of trains, latter exercised through signalmen—Diagram of organisation—Country station *v.* large station—Driver does not direct, only controls, his engine and obeys signals—Signalmen and their place in organisation—Station master acts as local representative of the company—Definition of general duties—Description of complex "frame" in signal-cabin.

CHAPTER IV

THE SIGNALMAN'S CONTROL	PAGE 45
<p>Main control through block system—Principles of block working—Difference between “normally blocked” and “normally clear”—Control by semaphores and signalling by dial instrument—Signal operations viewed from inside signal-cabin—“Permissive block”—Stop and examine: “blocking back”—Government exemption from block working when one engine in steam only on any system—Block system made compulsory by Act of Parliament, 1889—Signal repeaters—Semaphore signals defined—Does the block system reduce a signalman's responsibility?</p>	

CHAPTER V

POWER SIGNALLING	57
<p>Electric power replacing human labour for the movement of signal levers and points—What is a “detector”?—Description of a power signal-box—Advantages in case of long-distance points and a “triangular” junction—Automatic signalling of trains—Experiment on L. & N.E.R.—Power signalling on the Underground—“Normally blocked” and “Normally clear.”</p>	

CHAPTER VI

SUBSIDIARY MECHANICAL DEVICES AIDING CONTROL	64
<p>Power working at marshalling yards; Wath and Feltham—Control by interlocking—Protection of fouling points at junctions—Facing-point locks and locking bars—Drivers overrunning signals—Signal line working and mechanical protection—The electric staff or tablet—Staff and ticket arrangements—The Abermule accident.</p>	

CHAPTER VII

THE TELEPHONE AS A MEANS OF CONTROL	77
<p>Effect of the telephone in quickening thought—Increase in effective supervision obtained by general manager or superintendent—Usefulness to district superintendent, especially in case of emergency or accident—Number of telephone instruments in head offices—Daily conference by telephone—Telephone control over Midland cartage arrangements in London, and for the working of the L.G.O.C. buses—A goods agent's telephones—The new train control systems an adaptation of efficient telephones.</p>	

CHAPTER VIII

PAGE

THE ENGINE-DRIVER'S CONTROL 84

Mechanical aids for the engine-driver—Automatic stokers—Automatic speed recorders and cab signalling devices: both these devices widely used on Continent—Progress in France—M. Ferdinand Maison's summary—Psychological tests in Germany—Experiments in Great Britain—Automatic train control on the London Electric Railways—Progress in the U.S.A.

CHAPTER IX

THE GROWTH AND DEVELOPMENT OF THE NEW TELEPHONE CONTROL 95

Beginnings at Masboro', near Sheffield, Midland, and at Middlesbrough sidings, North Eastern Railway—The control system of the L. & Y.R., Victoria Station, Manchester—Developments on the Midland towards all-line control—Goods train control extended to include passenger train control—L. & N.E. Railway installations between Hull and Yorkshire collieries, and at Newcastle-on-Tyne—Doncaster and Newcastle main line (L. & N.E.R. controlled)—The L.M. & S.R. whole line system.

CHAPTER X

EXPERIMENTS ON THE LONDON AND NORTH EASTERN RAILWAY . 107

Four separate installations on the N.E.R. in different localities—Difference between train and traffic control—The Middlesbrough (Newport) office described—The Tyneside train control office—The Hull system of traffic control described—The new system of train control at York (main line): includes passenger working—Train recording and marshalling sections of control office—Relative responsibilities discussed.

CHAPTER XI

THE OLD LANCASHIRE AND YORKSHIRE RAILWAY METHOD . . . 130

Description of control office at Victoria Station, Manchester—Seventeen sections combined in a central office—Supervision of freight trains by central control—Methods and equipment of office—The geographical board—Token tickets and pegging explained—Allocation and distribution of carriages and wagons combined with train control—Allocation of guards' vans—Passenger and freight train records of running.

CHAPTER XII

PAGE

THE LONDON, MIDLAND AND SCOTTISH RAILWAY CENTRAL CONTROL AT DERBY	144
--------------------------------------------------------------------------------	-----

The Derby office and system described—Gradual development since 1905—Devolution to district offices—Masboro' Control Office taken for illustration—Office equipment—The control board, a time board, and system of pegging trains described—General and detailed instructions issued—Scope of control includes following functions: Supervision of freight train working; relief of trainmen; control of goods wagon stock; supervision of passenger train working; control of passenger carriages and stock; distribution of guards' vans; allocation of locomotive power; marshalling yard supervision—Important effects of central control on general organisation as a whole.

CHAPTER XIII

FUNCTIONS OF THE TRAIN CONTROLLER	178
---------------------------------------------	-----

Summary of controller's functions: first as train controller; other functions: (1) essential, (2) secondary—Train control; supervision of marshalling sidings; enginemen's hours; control of locomotives; rolling stock control, (a) wagons, (b) carriages—Equipment of office—Possibility of economies.

CHAPTER XIV

CONTROL OVER LOCOMOTIVES	192
------------------------------------	-----

A twofold problem: (1) Construction of locomotives, (2) distribution of locomotive power—Nature of problem; an American illustration—Two methods of organisation—Records of each engine; the card system—Modification of system in Great Britain taking place—Relation between this change and new train control.

CHAPTER XV

CONTROL ON THE UNDERGROUND	201
--------------------------------------	-----

Track mileage and number of passengers on the "Underground"—Junctions with main line infrequent and no goods trains—Importance of headways—Recording clocks at stations and in control office—Numerous efficient and automatic arrangements and devices—Power signalling and automatic train control throughout system.

CONTENTS

9

CHAPTER XVI

	PAGE
THE ROLLING STOCK CONTROLLER: (I) WAGONS	208
Daily wagon distribution; the problem—Office of wagon controller; his functions—Methods of control: the car accountant in U.S.A.—Card systems in England—The daily census—Graphs and statistics—The daily wagon report—Common user of wagons—L.M. & S.R. and L. & N.E.R. wagon control organisations.	

CHAPTER XVII

THE ROLLING STOCK CONTROLLER: (II) PASSENGER STOCK	220
Number of passenger vehicles in Great Britain—Carriage stock distribution—Normal or "roster" working; market stock; surplus or excursion stock—Passenger stock control office at Derby; daily "extras" board.	

CHAPTER XVIII

GENERAL EFFECTS OF THE NEW TRAIN CONTROL	224
Effect of mechanical appliances on individual character—The new control really a mechanical appliance; its effect upon signalmen, goods guards, passenger guards, engine-drivers, firemen—Effect upon organisation in general—Superintendent's office primarily affected: (1) in methods of train recording, (2) in regard to superintendent's control over locomotives—More extensive effects likely as usefulness of new control is appreciated.	

CHAPTER XIX

RESPONSIBILITY	232
Dangers of over-centralisation and importance of devolution—Effect of new system upon various grades—signalmen, guards, enginemen, etc.—Importance of sharing responsibility illustrated by case of yard master or yard foreman—Real responsibility is in proportion to knowledge which is more generally diffused by more efficient control.	

APPENDICES	241
----------------------	-----