

Public Works (1890) Department.

RAILWAY BRANCH.

G.O., No. 951 *Ry*

DATED 4th July

[Despatch Abstract.]

Return of accidents on Indian Railways.—
Observations of the Government of India on the
for the 3rd quarter of 1889 communicated to
the Consulting Engineer for Railways.

BACK PAPERS.

FURTHER PAPERS.

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

Abstract Returns of Accidents on Indian Railways for the 2nd quarter of 1889, issued with the Government of India, Public Works Department, Resolution No. 0210-R.T., dated 10th February 1890.

ERRATA.

Page 2.—Against "East Indian"—

In the 14th column, *for 3 read 33.*

" " 18th " insert I.

" " 20th " " I.

" " 23rd " *for 3 read 31.*

Also against "Eastern Bengal"—

In the 24th column, *for* 1 *read* 15.

Page 18.—Against "In England (United Kingdom)"—

In the 10th and 11th columns, *for* 13 *read* 131.

INDIAN RAILWAYS.

ABSTRACT RETURNS OF ACCIDENTS FOR THE QUARTER
ENDING 30TH SEPTEMBER 1889,

TOGETHER WITH

REPORTS OF THE INSPECTING OFFICERS UPON A CERTAIN ACCIDENT WHICH
WAS INQUIRED INTO.

APR. 11 1890
Will you kindly
send up when received
six copies of the Abstract
Return of accidents on
Indian Railways for the
3rd quarter of 1889. Please
do not lose sight of
this task in office or
casually for them for
that office might present
the spare copies. - R.R.
24/6

TABLE No. 1.

GENERAL TOTAL.

NUMBER OF PERSONS REPORTED DURING THE THIRD QUARTER OF 1889 AS KILLED OR INJURED ON THE SEVERAL RAILWAYS OPEN FOR TRAFFIC IN INDIA, DISTINGUISHING BETWEEN PASSENGERS, RAILWAY SERVANTS, AND OTHER PERSONS; AND DISTINGUISHING ALSO, IN THE CASE OF THE TWO FORMER CLASSES, BETWEEN ACCIDENTS HAPPENING FROM CAUSES BEYOND THEIR OWN CONTROL, AND ACCIDENTS HAPPENING OTHERWISE.

Mean Mileage open.	RAILWAYS.	PASSENGERS.			RAILWAY SERVANTS, OR SERVANTS OF CONTRACTORS.			OTHER PERSONS.			TOTAL ALL CLASSES.									
		From their own misconduct or want of caution.		TOTAL.	From causes beyond their own control.		TOTAL.	Whist passing over Railways at Level-crossings.		TOTAL.										
		Killed.	Injured.		Killed.	Injured.		Killed.	Injured.											
												Killed.	Injured.	Killed.	Injured.					
STATE IMPERIAL.																				
(a) 1,691½	East Indian	2	7	9	2	9	5	27	7	36	2	1	16	2	1	19	3	28	48	
(b) 1,618		7	10	17	2	14	6	16	8	30	1	2	18	2	1	20	4	33	51	
(c) 1,639	Rajputana-Malwa	1	4	5	1	4	2	8	3	9	...	...	6	3	...	6	3	10	16	
(d) 1,694½		1	3	4	...	4	1	5	5	9	...	...	8	3	...	8	3	13	16	
(e) 305	Bengal-Nagpur	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	1	2	
(f) 462		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(g) 856½	Southern Mahratta	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(h) 1,321	Do., Mysore Section	...	1	1	...	...	1	2	2	2	...	...	1	1	...	1	1	3	4	
(i) 1,364		...	1	1	...	...	...	7	2	9	...	...	2	2	...	2	...	4	10	
(j) 725	Indian Midland	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(k) 2,072½	North Western	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(l) 2,556		2	6	8	...	...	3	11	5	14	...	...	6	2	1	7	3	14	25	
(m) 641½	Oudh and Rohilkhand	...	3	3	...	...	1	10	6	11	...	...	7	3	...	7	3	13	17	
(n) 621½		...	1	1	...	...	...	4	2	5	...	...	3	2	...	3	2	5	8	
(o) 45	Wardha Coal	...	2	...	...	...	...	1	1	1	...	...	4	...	...	4	...	8	1	
(p) 45		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
STATE PROVINCIAL.																				
(a) 729½	Eastern Bengal	1	1	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	
(b) 872		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(c) 274	Nalhati	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(d) 273		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(e) 234½	Tirhoot	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(f) 273		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(g) 93½	Lucknow-Sitapur-Sherma	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(h) 105		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(i) 281	Jorhat	...	2	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(j) 25½		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
GUARANTEED COMPANIES.																				
(a) 844½	Madras	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(b) 889		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(c) 670½	South Indian	...	1	1	...	...	1	1	1	1	...	...	...	...	...	...	...	...	...	
(d) 737		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(e) 1,457½	Great Indian Peninsula	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(f) 1,439½		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(g) 461	Bombay, Baroda and Central India	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(h) 461		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
ASSISTED COMPANIES.																				
(a) 501	Darjeeling-Himalayan	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(b) 51		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(c) 51	Deoghur	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(d) 43		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(e) 78	Dibru-Sadiya	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(f) 78		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(g) 285½	Bengal and North-Western	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(h) 376		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(i) 91	Rohilkhand-Kumaun	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(j) 91		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(k) 8	Thaton-Duyinzaik	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(l) 8		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
FOREIGN.																				
(a) 191	Pondicherry	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(b) 354	West of India Portuguese	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(c) 59	NATIVE STATES.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(d) 58½	H. H. the Nizam's Guaranteed.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(e) 194½		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(f) 260½	H. H. the Gaekwar's	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(g) 53½		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(h) 68	Bhavnagar-Gondal-Junagarh-Porbandar.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(i) 83½		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(j) 124	Morvi	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(k) 124	Jodhpore	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(l) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(m) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(n) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(o) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(p) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(q) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(r) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(s) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(t) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(u) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(v) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(w) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(x) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(y) 124		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
(z) 124																				

TABLE

(a) Includes the Patna-Gya, Dildarnagar-Ghazipur and Tarakeehwar Railways.
 (b) " E. H. the Gaekwar's Mehsana-Vadnagar State Railway.
 (c) " the Kutchi-Umaria Branch.
 (d) " the Bellary-Kistna State Railway.
 (e) " the Sindh and Bhopal-Itarsi State Railways.
 (f) " the Amritsar-Pathankot and Rajpura-Bhatinda State Railways.

n INDIA, distinguishing between PASSENGERS, RAILWAY SERVANTS, and OTHER PERSONS, and classifying, as far as ACCIDENTS occasioning the DEATH or INJURY.

(g) Includes the Bengal Central Railway.
 (h) " the Pungroo-Mandalay extension.
 (j) " the Villupuram-Guntakal State Railway, Nellore Branch.
 (k) " the Dhond-Mannad, Amraoti and Khamgaon State Railways.
 (l) " the Bareilly-Pilibhit State Railway.
 (m) " the Bezwada extension.
 (n) Except where statistics for five quarters are not available for any line.

ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., reported during the THIRD QUARTER of 1889 as having occurred on the several RAILWAYS open for Traffic in INDIA, distinguishing the different Classes of ACCIDENTS, and the Number of PASSENGERS AND OTHERS, and of RAILWAY SERVANTS, KILLED OR INJURED in each Class of ACCIDENT.

TABLE No. 3.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., reported during the THIRD QUARTER of 1889, &c.—*continued.*

TABLE No. 3.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., reported during the THIRD QUARTER of 1889, &c.—*continued.*

(a) Includes the Sindia and Bhopal-Narsai State Railways.
(b) Includes 2 mrisson-Pithankot and Rajpura-Bhatinda State Railways.
(c) Includes 20 servants employed on colliery.
(d) Includes the Bengal Central Railway.

(a) Includes the Sindia and Bhopal-Itarsi State Railways.
(b) Includes Amritsar-Pathankot and Rajpura-Bhatinda State Railways.

(d) Includes the Bengal Central Railway.

TABLE No. 3.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., reported during the THIRD QUARTER of 1889, &c.—*continued.*

[illegible]

TABLE No. 3.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., reported during the THIRD QUARTER of 1889, &c.—continued.

* Not passenger. (a) Includes the Toungoo-Mandalay extension.

(b) Includes the Villupuram-Guntakal State Railway Nellore Branch.

(c) Includes the Dhond-Mannad, Amraoti and Kharggaon State Railways.

TABLE No. 3.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., reported during the THIRD QUARTER of 1889, &c.—continued.

SEE ALSO TABLE No. 4.

ASSISTED COMPANIES.

CLASS.	DARJEELING-HIMALAYAN.				DIOGHU.				DURG-SADRA.				BESGAL AND NORTH-WESTERN.				ROHILKHAND-KUTUB.			
	Number of Passengers and others.		Number of Servants.		Number of Passengers and others.		Number of Servants.		Number of Passengers and others.		Number of Servants.		Number of Passengers and others.		Number of Servants.		Number of Passengers and others.		Number of Servants.	
	No.	Killed.	Injured.	TOTAL ALL CLASSES.	No.	Killed.	Injured.	TOTAL ALL CLASSES.	No.	Killed.	Injured.	TOTAL ALL CLASSES.	No.	Killed.	Injured.	TOTAL ALL CLASSES.	No.	Killed.	Injured.	TOTAL ALL CLASSES.
1. Collisions between passenger trains, or parts of passenger trains	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Collisions between passenger trains and goods or mineral trains, engines, and vehicles standing foul of the line	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Collisions between goods trains, or parts of goods trains	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Collisions between light engines	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Passenger trains, or parts of passenger trains, leaving the rails	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6. Goods trains, or parts of goods trains, engines, &c., leaving the rails	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7. Trains or engines travelling in the wrong direction through points	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8. Trains running into stations or sidings at too high a speed	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9. Ditto over cattle on the line	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10. Ditto over obstructions on the line	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11. Ditto through gates at level-crossings	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12. The bursting of boilers of engines	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13(a). Ditto of tubes, &c., of engines	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13. The failure of machinery, springs, &c., of engines	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14. Ditto of tyres	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15. Ditto of wheels	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16. Ditto of axles	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17. Ditto of brake apparatus	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18. Ditto of couplings	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19. Ditto of tunnels, bridges, viaducts, culverts, &c.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
20. Broken rails	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21. The flooding of portions of permanent-way	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
22. Slips in cuttings or embankments	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
23. Fire in trains	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
24. Fire at stations, or involving injury to bridges or viaducts	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25. Other accidents	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL ALL CLASSES	12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Number of Passenger miles	206,949				257,740				405,563				16,909,619				2,250,216			
" of Servants employed	525				52				799				3,208				988			
Train mileage of all descriptions	29,592				3,294				30,703				106,298				21,981			

(c) Includes the Bareilly-Pilibhit State Railway.

TABLE No. 3.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., reported during the THIRD QUARTER of 1889, &c.—continued.

CLASS.	ASSISTED COMPANIES—continued.				FOREIGN.				NATIVE STATES.			
	THATON-DUYENAIK.		PONDICHERY.		WEST OF INDIA PORTUGUESE.		H. H. THE NIZAM'S GUARANTEED (c).		H. H. THE GARHWARS.		TOTAL ALL CLASSES.	
	No.	Killed.	Injured.	TOTAL ALL CLASSES.	No.	Killed.	Injured.	TOTAL ALL CLASSES.	No.	Killed.	Injured.	TOTAL ALL CLASSES.
1. Collisions between passenger trains, or parts of passenger trains	...	...	...	...	...	...	...	...	...	...	...	...
2. Collisions between passenger trains and goods or mineral trains, engines, and vehicles standing foul of the line	...	...	...	...	...	...	...	...	...	...	...	...
3. Collisions between goods trains, or parts of goods trains	...	...	...	...	...	...	...	...	...	...	...	...
4. Collisions between light engines	...	...	...	...	...	...	...	...	...	...	...	...
5. Passenger trains, or parts of passenger trains, leaving the rails	...	...	...	...	...	...	...	...	...	...	...	...
6. Goods trains, or parts of goods trains, engines, &c., leaving the rails	...	...	...	...	...	...	...	...	...	...	...	...
7. Trains or engines travelling in the wrong direction through points	...	...	...	...	...	...	...	...	...	...	...	...
8. Trains running into stations or sidings at too high a speed	...	...	...	...	...	...	...	...	...	...	...	...
9. Ditto over cattle on the line	...	...	...	...	...	...	...	...	...	...	...	...
10. Ditto over obstructions on the line	...	...	...	...	...	...	...	...	...	...	...	...
11. Ditto through gates at level-crossings	...	...	...	...	...	...	...	...	...	...	...	...
12. The bursting of boilers of engines	...	...	...	...	...	...	...	...	...	...	...	...
13(a). Ditto of tubes, &c., of engines	...	...	...	...	...	...	...	...	...	...	...	...
13. The failure of machinery, springs, &c., of engines	...	...	...	...	...	...	...	...	...	...	...	...
14. Ditto of tyres	...	...	...	...	...	...	...	...	...	...	...	...
15. Ditto of wheels	...	...	...	...	...	...	...	...	...	...	...	...
16. Ditto of axles	...	...	...	...	...	...	...	...	...	...	...	...
17. Ditto of brake apparatus	...	...	...	...	...	...	...	...	...	...	...	...
18. Ditto of couplings	...	...	...	...	...	...	...	...	...	...	...	...
19. Ditto of tunnels, bridges, viaducts, culverts, &c.	...	...	...	...	...	...	...	...	...	...	...	...
20. Broken rails	...	...	...	...	...	...	...	...	...	...	...	...
21. The flooding of portions of permanent-way	...	...	...	...	...	...	...	...	...	...	...	...
22. Slips in cuttings or embankments	...	...	...	...	...	...	...	...	...	...	...	...
23. Fire in trains	...	...	...	...	...	...	...	...	...	...	...	...
24. Fire at stations, or involving injury to bridges or viaducts	...	...	...	...	...	...	...	...	...	...	...	...
25. Other accidents	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL ALL CLASSES	...	...	...	...	...	...	...	...	...	...	...	...
Number of Passenger miles	24,232				12,744,082				1,112,258			
" of Servants employed	46				2,296				211			
Train mileage of all descriptions	2,256				157,353				13,686			

(c) Includes the Bezwada Extension.

TABLE No. 3.—ACCIDENTS TO TRAINS, ROLLING-STOCK, PERMANENT-WAY, &c., reported during the THIRD QUARTER of 1889, &c.—concluded.

SEE ALSO TABLE No. 4.															
NATIVE STATES—contd.															
BHAVAGAR-GONDAL-JESAGAR-PORHANDAR.				MORVI.				JOBETPOR.				TOTAL OF ALL RAILWAYS.			
CLASS.				CLASS.				CLASS.				CLASS.			
No.	Number of Passengers and others.		TOTAL ALL CLASSES.	No.	Number of Passengers and others.		TOTAL ALL CLASSES.	No.	Number of Passengers and others.		TOTAL ALL CLASSES.	No.	Number of Passengers and others.		TOTAL ALL CLASSES.
	Killed.	Injured.			Killed.	Injured.			Killed.	Injured.			Killed.	Injured.	
1. Collisions between passenger trains, or parts of passenger trains standing foul of the line	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
2. Collisions between passenger trains and goods or mineral trains, engines, and vehicles	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
3. Collisions between goods trains, or parts of goods trains	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
4. Collisions between light engines	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5. Passenger trains, or parts of passenger trains, leaving the rails	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
6. Goods trains, or parts of goods trains, engines, &c., leaving the rails	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
7. Trains or engines travelling in the wrong direction through points	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
8. Trains running into stations or sidings at too high a speed	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
9. Ditto over cattle on the line	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
10. Ditto through gates at level-crossings	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
11. The bursting of boilers of engines	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
12. (a). Ditto of tubes, &c., of engines	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
13. The failure of machinery, springs, &c., of engines	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
14. Ditto of tyres	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15. Ditto of wheels	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
16. Ditto of axles	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
17. Ditto of brake apparatus	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
18. Ditto of couplings	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19. Ditto of tunnels, bridges, viaducts, culverts, &c.	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
20. Broken rails	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
21. The flooding of portions of permanent-way	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
22. Slips in cuttings or embankments	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
23. Fire in trains	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
24. Fire at stations, or involving injury to bridges or viaducts	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
25. Other accidents	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
TOTAL ALL CLASSES				24	...	2	...	2	...	...	...	1	...	...	...
Number of Passenger miles				9,147,764				1,889,842				3,073,300			
" of Servants employed				860				576				436			
Train mileage of all descriptions				97,737				15,258				24,136			
												1,032,430,454			
												166,658			
												11,906,713			
												838			
												31			
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Report on the Derailment of a Passenger Train which occurred at mile 327½ on the Nágpur Branch of the Great Indian Peninsula Railway at 2 A.M. on the 18th July 1889.

1. The accident, of which the following is a report, was of a very serious character: though happily unattended by loss of life, it caused injury, more or less severe, to twenty-one native passengers, and the destruction of rolling-stock and permanent-way, estimated at about R9,000.

2. The derailment took place about half-way between Nándúra and Jalamb Junction Stations, that is, at about mile 327½, on the diversion which forms the east approach to a girder bridge.

3. The circumstances of the accident are briefly as follows. The Down Nágpur Passenger Train (No. 197) which was wrecked, consisting of twenty vehicles, left Nándúra (miles 324½) at 1.56 A.M., or four minutes late, on the 18th July. She had passed over the bridge at mile 327½ and proceeded safely to the diversion forming the east approach, but at the middle of the eastern half of the same the train became partly derailed.

The engine, brake and four 3rd class carriages next in rear remained on the rails; behind these came three 3rd and one 2nd class; the latter four were derailed but did not leave formation.

All the above had apparently passed over the diversion in safety and were derailed on the straight.

The condition of the remainder on examination turned out to be as follows:—In rear of the coaches named above came a 1st class and postal van; they were tilted over but went only partly down the embankment, which at this place is 6 or 8 feet high; then came six 3rds; four of these lay at the bottom of the embankment lying on their sides; another 3rd. was partly down the embankment, and a 3rd class, the road van and rear brake were derailed on the top of the bank.

The four 3rd class-carriages which fared worst contained about 120 passengers, chiefly pilgrims returning from Pandharpur fair, and many of them aged and decrepit.

They were extricated through the exertions of Mr. Wright, Traffic Inspector, who happened to be a passenger in the train, assisted by two European 3rd class passengers, a native policeman, and the guards. The engine was detached, sent on to Jalamb for aid, and eventually all the passengers were transhipped, and resumed their journey at 8.20 A.M. Those too severely injured to proceed (three in number) were cared for in the Shegaon hospital; the remainder went to their respective destinations.

A portion of the damaged stock was taken on to Jalamb; the four 3rds at the bottom of the bank will be broken up and their materials removed; the remaining vehicles were hauled to Nándúra. Communication was restored by linking in the up line to a point beyond the scene of the accident, and then crossing over to the down.

4. This derailment must be ascribed to either defective rolling-stock or defective permanent-way.

With regard to the former, I do not find that the stock was in fault. I personally gauged, at Jalamb, the wheels of the first five of the derailed coaches, and carefully examined them: none were even badly worn, and all might be brought into use with safety.

With regard to the condition of the permanent-way at the time of the accident, nothing could be ascertained with any certainty on account of the destruction caused to it by the derailment.

The reverse curves, however, must have had a length over all of at least 530 feet. The Permanent-way Inspector stated in evidence that he had tested the cant two days before the accident and found it $2\frac{1}{8}$ ", and where the spread of the gauge was greatest $\frac{3}{4}$ " was still remaining after the coaches had dropped between the rails. I accordingly am of opinion that the curve had sufficient cant. The sleepers (creosoted pine, where the spread was greatest) appeared firm and solid; they were thoroughly examined, and I consider were in a fit condition to be on the road, and this opinion was borne out on the sleepers being sawn through for inspection.

I can, however, find no other explanation for the spread of the gauge which caused the derailment than that the fibres of the sleepers cannot have been so good as in each case they appeared, and that they might have "perished" to such a degree that they were incapable of resisting the centrifugal pressure of the wheel flanges of the wrecked train.

(Signed) R. SIVEWRIGHT,

Officiating Deputy Consulting Engineer.

Bombay, 10th August 1889.

Note by the Consulting Engineer for Railways.

The causes which might have led to this accident have been most carefully enquired into, but the result is not satisfactory. The details are described in Mr. Sivewright's report, and are further minutely gone into in the reports by the Chief Engineer, Locomotive Superintendent, and General Traffic Manager of the G. I. P. Railway (also attached); so they need not be further described.

2. The stock on the train does not appear to have been in any way defective. The flanges of the wheels of the first five vehicles were in good order, and the gauge of the wheels was correct; and the same is to be said of the wheels of the first two carriages which left the rails and were overturned. Nor does there seem to have been anything wrong with the wheels of the engine, so it is difficult to ascribe any fault to the condition of the stock.

3. The permanent-way was also in very fair order. The pine sleepers were not new, but they were sound, although possibly slightly gone at the spike holes. The chairs were, however, spiked to the sleepers through ordinary bearing plates, so the whole of the spikes would resist any tendency of the rails to spread. The reverse curve was laid with very easy curves of about 2,500 feet radius, and the cant originally given was sufficient for a high speed. It is very probable that the heavy rains at the time had made the road a little uneven, and possibly the cant had been lessened somewhat. But the indications are sufficient to show that there was at least half an inch of cant left in the road after the accident had occurred, and this should have been sufficient for the moderate speed at which the passenger train should have been running. And I know, from actual experience in the inspection train which passed over the place at probably thirty-five miles an hour only eight hours previously to the accident, that the want of sufficient cant was not felt in the least. I passed slowly over this reverse curve on the morning of the 16th July, and being in the verandah of the end carriage, I had a full view of the road. And I passed the same spot on the afternoon of the 17th at high speed and was observing the road from the verandah of the same carriage, which had been reversed at Nágpur. I am quite certain that even if there had been a gradual spreading out of the rails

to any serious extent, I must have noticed it. Indeed, had such been the case, the engines would have been the first to find it out. So it is difficult to say that there was anything seriously wrong with the road eight hours before the accident.

4. As regards the speed of the passenger train accounts vary. The slight inaccuracy in the Engineering Department notice as to where the speed was to be reduced need not be noticed, as the driver was aware that the speed had to be reduced over the bridge close by where the accident happened; and although the time was 2.0 A.M., the evidence is quite clear that the speed of the train was reduced before passing the bridge. But in passing through stations the practice of drivers is to put on steam before the trailing points are passed, and so in this case the driver acknowledged to having put on steam on the bridge and before he was clear of the diversion. What speed he attained before getting near the end of the diversion cannot be said as he felt his train jerk before he got there and shut off steam, but even if he had been steadily increasing up to twenty miles an hour, there seems to be no reason why any carriages should have left the road.

5. It may be held that the Engineering notice to reduce speed at mile 327½ to 10 miles an hour was too vague, and that the points between which a reduced speed was desired should have been specified. In theory this is doubtless true, but in practice the method of imposing a certain speed at a certain point—say, at the centre of the diversion—is generally sufficient. The diversions are always capable of bearing a much severer test than that imposed, and the main point to be gained by restricting the speed is to be certain that no really high speed can be attained while passing near to that point.

6. The suggestion that the high speed of the special inspection train when passing this point strained the road must be noticed. If I am making an inspection by special train, as in this case, I desire to travel at a speed from five to ten miles higher than that at which the ordinary passenger trains run, as then the defects of the road are rendered more apparent. On the day in question we would, under ordinary circumstances, have changed our Badnera engine at Shergaon, but the new engine was of too heavy a type to go down the Khámgaon branch, so we took on our Badnera engine to Bhusáwal. The driver had not been working for months on the Shergaon-Bhusáwal Section, so was new to the road, and unfortunately overshot mile 327½, where the speed should have been sensibly reduced. We certainly hit the tangent point of the curve rather hard, but that was all, as no further effects of any sort were felt during the passage of the train over the reverse curve. The point of the curve hit by our train was from 120 to 150 feet from the spot where the passenger train went through, and as we went smoothly on beyond that, I cannot think that our train created any disturbance of a serious nature to the road. I certainly noticed nothing, and I was carefully watching the road from the verandah of the rear carriage. On entering from the straight we had hit the tangent point of some other curves which is apparently in butted the cause to the method of giving super-elevation which is given at force on this section of the G. I. P. Railway. No super-elevation is given at the commencement of the curve, but it is gradually given until the required maximum is attained. But the maximum super-elevation is as much wanted at the commencement as at the centre, and should therefore be commenced on the straight; consequently at high speed we felt the want of the super-elevation at the tangent point.

7. I am inclined to ascribe the cause of the accident to the driver of the train putting on steam too suddenly. Travellers by the G. I. P. Railway trains know only too well the severe jerks which are experienced not only at starting, but also often in the course of a run between stations; and as the buffing and draw-

gear under some of the older carriages is weak, the carriages cannot always be properly coupled up. I think, therefore, that the driver must have put on steam too suddenly, and sent such a severe jerk through the front carriages as to cause the leading wheels of the sixth carriage to mount the rail. This would make the carriage turn slightly round, and the trailing wheels then probably fell through, the couplings still holding, the trailing wheels would burst the road, and the following carriages would naturally fall through. I don't think the speed could have been at all excessive, probably not twenty miles an hour, or else the carriages would have telescoped into each other, and the damage to life and stock would have been much greater. The Locomotive Superintendent has, I am aware, been doing his best to make the drivers be more careful when putting on steam, but unless the buffing and draw-gear is sufficiently strong to admit of fairly tight coupling, it is most difficult to avoid the jerks caused by putting on steam too suddenly.

* * * * *

(Signed) F. FIREBRACE, *Lieut-Colonel,*
Consulting Engineer for Railways.

Poona, 24th August 1889.

APPENDIX A.

GREAT INDIAN PENINSULA RAILWAY COMPANY.

General Traffic Manager's Office,
Bombay, 23rd July 1889.

No. 4070.

THE AGENT,
G. I. P. Railway, Bombay.

DEAR SIR,

With reference to my report No. 4019 of the 19th instant, as to the accident near Nándúra early in the morning of the 18th idem, I beg to say that the accident happened at a diversion which was being temporarily used in connection with the new doubling works.

The single line over the bridge at the place referred to (which will be the down line) has been used for a considerable time, and, in connection with the doubling works, the new up line has been laid over the bridge, and the traffic has been turned from the present single road (which is to be the down road) on to the road which will be the new up line, and over the bridge, and for some short distance beyond it the trains are running on the to be new up road. The accident occurred at about the spot where trains are brought back from this up line, thus temporarily used, on to the existing single line at the east or Jalamb end of the diversion.

This diversion has been used for some months on, as I understand, the authority of the Consulting Engineer, who sent a representative to inspect it before it was brought into use for traffic.

2. I find that the engine and brake and four third class carriages in front of the train kept on the rails.

Four 3rd class carriages and a 2nd class were derailed only, then a 1st class and a post office van were lying half-way down the bank almost on their sides, the following four 3rd class carriages were lying at the bottom of the bank also on their sides, another 3rd class carriage was half-way down the bank, while one 3rd class carriage, a road van and the rear brake van were simply derailed.

3. The train was a heavy one, being very full of passengers, who were returning from the Pandharpur fair.

We carried a considerable number to the fair, though not so many as in previous years owing to the prevalence and the fear of cholera.

4. You have been already advised that twenty native and one European 3rd class passengers were injured; but the statement, signed jointly by the Government Apothecary of the Civil Dispensary at Shegaon and the Company's Apothecary at Badnera, shows twenty-one natives and one woman (with a European name). Six of these are marked as having received serious injuries; all the rest are marked as slight injuries.

In addition to these, a European named William Staines, also complained of a bruise on his neck and another on his hip; but they were only slight, as he was able to help in getting out the passengers, which he did with great kindness.

I enclose a copy of the list* of all who complained and who were treated by the medical staff. Staines' name is not entered on this list. Nine of the injured passengers were women;

* Not printed.

they were all 3rd class passengers.

After being attended to, they all insisted upon going to their homes.

5. The steps taken to put the road right and get the passengers through were promptly carried out, and by three or four o'clock in the afternoon trains were allowed to pass slowly over the spot, and in the course of a few hours afterwards the road was stated to be all right and trains resumed their ordinary running.

* * * * *

7. I do not propose to delay this report for my final report about the accident, the papers now before me not being complete. I will make the final report as quickly as possible.

8. But with regard to the remark that some previous train must have strained the road, I may say that I understand that the Permanent-way Inspector's statement is to the effect that the road at this point had been specially examined by him and gauged three days before the accident; also that he had lorried over it about nine hours before the accident (that is, about four o'clock in the afternoon of the 17th) and had found it right; for, he says, if it had not been right to gauge, the wheels of his lorry would have dropped between the rails.

After the Inspector had lorried over the spot three trains passed before the accident occurred, namely, *first*, the Up Special Inspection Train in which yourself, the Consulting Engineer, the Chief Engineer, the Locomotive Superintendent, and myself travelled; *second*, the No. 92 Up Goods Train due at the spot at about half-past six, but which was delayed for the special to precede it; and *third*, the No. 51 Down Goods Train due at the place at about ten o'clock.

The special train ran tolerably fast. The two goods trains ran at ordinary speed.

9. The train to which the mishap occurred was running at just about right time. The driver said he left Nándúra four minutes late, and that he

passed on to the diversion at ten miles an hour, but that, upon getting on to the straight line on the diversion, he was going at from twelve to fifteen miles an hour.

Yours truly,

(Signed) HENRY CONDER,
General Traffic Manager

APPENDIX B.

GREAT INDIAN PENINSULA RAILWAY COMPANY.

General Traffic Manager's Office,
Bombay, 10th August 1889.

No. 4431.

THE AGENT,

G. I. P. Railway.

DEAR SIR,

With reference to my letter No. 4070 of the 23rd ultimo, as to the accident to the No. 197 Down Passenger Train between Jalamb and Nándúra on the 18th idem, I beg to say that I have now received the further information as to the occurrence which enables me, so far, to complete the report of the case.

I enclose a copy of the summary and of the evidence taken at the joint enquiry held at Nándúra Station on Saturday, the 20th July, and also of the joint finding then arrived at.

2. The Chief Engineer and the Locomotive Superintendent and myself met on Wednesday, the 7th instant, and discussed the matter very fully, and we then saw and questioned some of the members of the staff of the three departments who could throw light upon, or give further information about, the case.

3. I have little to add to what was said in my letter No. 4070 of the 23rd ultimo and previous reports as to what may be called the circumstances and details of the accident. They appear to have been correctly stated therein, except that, from the position of the first marks on the rails which show derailment, it seems to be clear that it must have occurred at from 120 to 150 feet before the train reached the spot where the diversion comes back on to the down road, and not at that spot, as was at one time supposed, and as was stated in the first paragraph of my report No. 4070.

4. I find that the damage to the permanent-way is estimated at about R 1,460 and to the rolling-stock at about R 7,735. I enclose copies of the statements* giving the details

* Not printed.

of these damages.

5. In addition to these damages, the telegraph wires were broken in the accident, but the cost of repairs would be hardly more than nominal.

The most serious part of the telegraph breakages was the interruption in the communication, causing delay to messages, and in getting information. The first telegrams about the accident had to be sent by the Government wires.

6. In regard to the injury to the passengers I find that Mr. Wright, the Traffic Inspector, who was in the train, and was riding in the carriage, part of

which is used by the Post Office, which was one of those that were overturned, received some bruises, but fortunately they were only slight. Mr. Wright did his best to re-assure the passengers, and organised and superintended and helped in the steps taken to extricate and relieve them.

7. You may possibly have seen a reference to the accident in the *Times of India* of the 25th ultimo, in which mention is made of a rumour that three or four of the passengers had since died from the injuries they had received. It is added that the rumour required confirmation.

I only refer to it in order to say that, so far as we know, there has been no such result of the injuries, and I hope that we may not have to report any fatal termination in any case.

We have made, with some caution, some enquiry as to the several cases of injury, and I find that there are none that are likely to prove very serious; in fact, that except in two or three cases the passengers are well again.

8. I think I have thus advised you of all the matters so far connected with the occurrence to which I need refer.

I shall be glad if you will let me see a copy of the report of the Deputy Consulting Engineer, Mr. Sivewright, who was present at the enquiry on the 20th ultimo.

9. You are aware of the position of matters before the mishap when you passed the place with the Consulting Engineer and other of the Company's officers in the Up Special Inspection Train between six and seven o'clock in the evening on the 17th ultimo, only a few hours before the accident.

It should be borne in mind that the jerk which was felt in that train when it passed, as an Up Train over the curve on to the diversion, at the Nágpur end of it, was at a spot which was from 120 to 150 feet from the place where the carriages first left the rails with the Down Train which had not passed over the curve where the jerk was felt in the inspection train, and further, that the engine and some of the carriages of the train that met with the accident passed safely over the curve where the jerk was felt in the inspection train.

10. The speed of the inspection train at this place has been variously estimated to have been thirty, thirty-five, forty and even more than forty miles an hour. I find from the records, which are apparently quite reliable, that it took twenty-five minutes to run that train, the distance (eight miles) from Jalamb to Nándúra (between which places the diversion is situated); and as that is not quite twenty miles an hour, the speed is not likely to have been at any part of that distance more than about twenty-five miles an hour.

But twenty-five or even thirty or thirty-five miles an hour cannot be said to have been excessive speed for such a light train as that.

11. Two causes have been considered as likely to have contributed to the accident.

One is the condition of the road.

The other is an impression that the train which met with the accident was going too fast.

12. As to the speed, the driver states that when he got on the straight part of the diversion he gave steam to the engine, and he thinks that the speed was increased from twelve to fifteen miles an hour. I should think it likely that the fifteen miles was somewhat exceeded, but not to any great extent, for there was neither time nor distance for the train to get up any high speed. The driver states that he considers that he was justified, under the instructions he had, in the course he took.

I am of opinion, also, that the damages, though considerable, show that there cannot have been any great speed; for if there had been, both the passengers and the stock would have suffered much more seriously than they did. A sum of less than eight thousand rupees for the repair of fifteen carriages that have passed through such an experience as these did can hardly be considered as a very large amount, and the injuries to the passengers are far less serious than might have been expected, or than would almost certainly have occurred, if there had been any great speed.

The speed, therefore, does not appear to account for the mishap, and I am inclined to think that it had but little to do with it.

13. As to the other possible cause, namely, the condition of the road, it is difficult to say how much of its state after the accident was caused by the accident rather than led to it.

I cannot help thinking that the heavy rain, of which we had experience for some hours before we passed the place, and which, we hear, was renewed after we had passed, must have had some effect on the road. The diversion is on a comparatively new road, which has not had the test of a monsoon over it.

It is right also to say that at the spot where the carriages first left the line, those who were in the inspection train, some seven or eight hours earlier than the accident, did not notice anything the matter, although they were tolerably certain to have done so if there had been any glaring defect, seeing that the jerk at the curve had arrested attention, and some of them were actually watching the road.

14. There are no fixed signals at the diversion, and therefore, in accordance with usual rule in such cases, the hand signal referred to in the Chief Engineer's report was shown by signalmen appointed and controlled by the Engineer's Department. The evidence of the two signalmen was so contradictory, caused apparently by their not being able to understand clearly the questions put to them, that it was quite unreliable.

15. The Chief Engineer had shown me his report No. 7534 of the 9th instant, to your address, about this matter, and I agree generally with what he has said in it.

16. I am of opinion that none of the train or traffic staff can be held to be, in any way, responsible for the accident, or to have contributed to it.

Yours truly,

(Signed) HENRY CONDER,
General Traffic Manager.

APPENDIX C.

Particulars of a joint enquiry held at Nándúra Station on Saturday, the 20th July 1889, in reference to derailment of 197 Down Passenger leaving Bhusáwal on Wednesday night, the 17th instant, at 11-30 P.M., at mileage 372½.

PRESENT:

MESSRS. R. SIVEWRIGHT, Offg. Deputy Consulting Engineer to Government.

C. WEST, District Resident Engineer.

J. GARRATT, District Traffic Superintendent.

T. C. BONNER, Assistant Locomotive Superintendent

The following witnesses were examined:—

1. William Glover, Driver of 197 Down Passenger.
2. E. Green, Head Guard, 197 Down Passenger.
3. J. Wright, Traffic Inspector.
4. H. Hart, P. W. Inspector.
5. Essoo Pandoba, Signalman, mileage 327½.

Summary.

It would appear that 197 Down Passenger left Bhusáwal right time on night of 17th instant, made up of 20 vehicles, in following order:—One brake van, eight 3rd class carriages, one 2nd class, one 1st class, one post office van, six 3rd class carriages, one road van, and one brake van.

The train was in charge of Guard E. Green with C. Oliver as second guard. The train proceeded all right to Nándúra and left that station at 1-56 A.M. for Jalamb. That on arrival at mileage 327½ the train became derailed owing to the bursting of the road on the diversion curve at east of Jalamb end of girder bridge, leaving it in the following position:—The engine, front brake and four 3rd class carriages following kept the road. Third class Nos. 258, 324, 1252, 2019, and 2nd class 1008 were derailed.

The above were all coupled together and standing between telegraph posts 327-14½ and 327-15½. The space between 327-14½ and 327-13 was clear, but between 327-13 and 12 1st class 27 and post office carriage 494 were lying half-way down the bank almost on their sides, and 3rd class 747, 1249, 159, and 576 were lying at bottom of embankment on their sides, third class 347 half down the bank and 3rd class 2021, road van 2824 and brake van 1303 derailed but on the top. That the train became derailed at telegraph post 327-11½, and for a couple of rail lengths the road appears to have opened out, and from this point the road was badly broken up for about three telegraph posts. The evidence of the Permanent-way Inspector shows that this road had been specially examined and gauged three days previously, and also that he had lorried over it the same evening about nine hours before the accident, and found it all correct. The members of the Committee carefully examined the road and found at the point of derailment the gauge was 2½ inches wide. Had the road been in this condition at the time the Inspector passed over, it must have been detected as his lorry would have dropped between the rails. The marks made by the shifting of chairs and bearing plates were very plain, evidently very recent and could not have escaped the Inspector's attention. After the Inspector lorried over the diversion, three trains passed before the accident, namely, the Inspection Up Special, No. 92 Up Goods, and No. 51 Down Goods, and the widening of the gauge must have occurred during this time. The special train appears to have run on to the diversion very fast and may have strained the road, as the curves were not laid with sufficient cant for high speed.

Finding.

We find on examination of the road at the point of derailment that the gauge was gradually opened from zero to 2½ inches on outer curve of diversion at east end of bridge at 327-11½ mileage, at which point the train became derailed. There is absolutely no evidence to account for the widening of this gauge. We find that the speed was in excess of the cautious driving notice for this point, but we also consider that this speed alone was not sufficient to account for this

derailment, except on the supposition that some previous train had passed over this point at an excessive speed and strained the road.

(Signed) T. W. BONNER,
Assistant Locomotive Superintendent.

(„) J. GARRATT,
District Traffic Superintendent.

(„) C. WEST,
District Engineer.

1st Witness, William Glover.

I was the driver in charge of 197 Down Passenger from Bhusáwal to Badnera. On Wednesday night, the 17th instant, I left Bhusáwal right time, and came on all right to Nándúra, which station I left at 1-56 A.M. or four minutes late. About ½ or ¾ of a mile from mileage 327½ I whistled for a signal and a green light was shown. I passed this mileage at about ten miles an hour. When at the bridge I exchanged signals with my guards and put on steam. Before getting on to the straight over the diversion I was going from twelve to fifteen miles an hour. Just before coming off the diversion I felt my engine oscillate, and I shut off steam and looked back and immediately felt a jerk and saw the train was derailed. I then put on steam in order to tighten the couplings, and in a few seconds I shut off gradually and brought the train to a stand. I pulled the train up at mileage 327-15. I put on steam for the purpose of keeping the train from going down the embankment. On coming to a stand I found that the brake and four succeeding vehicles remained on the road. After waiting about twenty minutes I received orders from Mr. Wright, the Traffic Inspector, to proceed at once to Jalamb with the front brake and three 3rds. I have been a driver for 8 or 9 years, and in the service of the Company 13 years.

Questioned.—I did not understand that I was to retain the speed of ten miles an hour after passing mileage 327½, and my line clear ticket was endorsed "Speed ten miles an hour at 327½." I came over this diversion with the 82 Up Passenger on the night or early morning

of 13th, when I did not notice any oscillation or anything unusual at this point.

Guard E. Green.

I am a Head Passenger Guard on the G. I. P. Railway. I was in charge of 197 Down Passenger on night of 17th instant from Bhusáwal to Badnera. I left Bhusáwal right time. My train consisted of 21 vehicles on leaving Bhusáwal, one of which was detached at Nádgaon. I came on all right to Nándúra, and left that station at 1-56 A.M. or four minutes late. We proceeded all right to mileage 327½. After passing the level-crossing gate the driver whistled and shut off steam. We passed mileage 327½ about ten or twelve miles an hour. On passing the bridge I gave all right signal to the driver on getting same from my second guard. On leaving diversion I felt a severe jerk and was knocked forward against the brake handle. The train shortly came to a stand. I was looking out when the driver came up and said he thought something was off the road, and on getting out I found the train derailed in the following position:—

The engine, brake and four 3rds were on the rails; three 3rd class and one 2nd were derailed but on the bank. The couplings of these carriages remained intact. The 1st class and postal van were lying half-way down the bank on their sides, four 3rds were lying at the bottom of the bank on their sides, another 3rd partly down the embankment, and one third road van and rear brake were derailed on the top of embankment. I assisted in getting out the passengers and then worked under orders of Mr. Wright.

Mr. Wright.

I am Traffic Inspector on the Nágpur District. I was travelling in 197 Down on night of Wednesday the 17th instant. I was travelling in the Post Office van and was awakened by a severe jerk. The carriage oscillated very much and then fell over on its side, partly down the embankment. I forced the upper-door open and got out. The guard at this time came up and I took his lamp and went to the top of the 3rd class carriages which were down the embankment to ascertain if any one was killed and to reassure the passengers. I examined all the derailed carriages, the 3rds contained from 30 to 40 passengers each. Then with the assistance of Guard Green, two 3rd class European passengers and a police sepoy, I extricated all the passengers, which was completed about 3.45 P.M. I found about 20 passengers more or less injured; as soon as daylight came the whole of the passengers were transferred to the carriages of 82 Up and left the scene of accident at 8.20 A.M. There was a distance of about 350 feet between the 1st class and the rear of the front portion of the train remaining on embankment. I last passed over this point in the inspection special train on the up journey the evening of 17th about 7 P.M. The signalman was then standing on the

west side of bridge, about mileage 327.9. The driver appeared to reduce speed on coming on to the diversion at east end. I did not then notice anything unusual at this point.

H. Hart, P. W. Inspector.

I laid the diversion at 327.33 on 7th April. I examined the diversion by gauging it and testing the cant of the curves with a level three days before the accident and found it all right, the cant being $2\frac{1}{2}$ inches in the centre of the curve. During the time the diversion has been worked, I have not found the gauge wider at all, and I have not had to respike any of the sleepers. I hurried over the diversion on the afternoon of 17th about two hours before the Special Inspection Train. I saw nothing wrong with the road, the rails where the accident occurred have not been moved since the accident. There is one signalman on duty at this bridge. He has orders to show his signal at the end of the diversion to which a train is approaching, and I have noticed that he generally does this.

Essoo Pandoba, Signalman on duty at 327.33 on nights of 17th and 18th July, says that the train that met with the accident passed him at high speed and did not reduce speed as usual.

APPENDIX D.

GREAT INDIAN PENINSULA RAILWAY.

*Chief Engineer's Office,
Bombay, 20th July 1889.*

No. 6816.

THE AGENT.

DEAR SIR,

Accident to 197 Down Passenger Train at mileage 327.33, Nágpur Branch, on the 18th instant.

This occurred at the Nágpur end of a diversion of the main line from the Down (old) to the Up (newly made for double line) side over a bridge, the mileage of which is given above. The diversion was inspected and passed by a representative of the Consulting Engineer, Mr. Sivewright, on the 8th April, so that it has worked safely for a period of over three months.

On the 16th instant Colonel Firebrace inspected the bridge, which has, in connection with the doubling of the line, been converted from a single line bridge of six 30-foot girder openings carried by masonry piers into a double line bridge of two 52-foot and three 30-foot girders carried by new screw pile piers and the old abutments. He on that day arranged for his Deputy to be present three days later to test the bridge and sanction the re-diversion of traffic over the down line side. My inspection carriage in which Colonel Firebrace travelled was at the rear of the train, so that after we left the bridge we continued for some distance to obtain a good view of the diversion of the line over it, but neither of us observed any defect. Late on the following evening when returning from Nágpur we passed over the diversion at a speed exceeding, I think, forty miles an hour, and as we did so, our carriage, still at the rear of the train, received a violent jolt, which we attributed to excessive sharpness of the curve at its junction with the straight portion of the line. Neither the jolt nor the apparent defect was so bad as to suggest that they were calculated to produce an accident to trains travelling at ordinary speed, and at the time I considered that the jolt we experienced had been accentuated by our very rapid passage over the place. I nevertheless realized that the place required attention, and at the next station I despatched a telegram to the Resident Engineer and Permanent-way Inspector, instructing them to ease the curve early next morning.

Our Inspection Special was followed by an Up Goods Train, and the next to pass over the diversion was that to which the accident occurred.

The engine, front brake and three 3rd class carriages passed the defective spot safely and remained on the rails; but the remaining vehicles—one 2nd, one 1st, one post office, nine 3rd class, and the rear brake van—all left the metals, seven of the carriages being precipitated down the bank 9 feet in height, where they lay on their sides.

Providentially no one was killed, though some twenty passengers were more or less injured.

Mr. Mallet, Consulting Engineer to the Government of India for Railways, Central Division, who was travelling from Nágpur to be present at our meeting with the Indian Midland Railway officials at Itársi, was on the spot soon after the accident occurred, and he tells me that in his opinion the accident was caused by pine sleepers so defective as to permit of the gauge spreading. He considers too that the train must have been going at an excessive rate of speed.

I must, however, defer reporting to you more definitely on these points until I obtain further information from the District Engineer and know the result of the joint enquiry which is to be held to-day.

Yours truly,

(Signed) J. G. H. COLLISTER,
for Chief Engineer.

APPENDIX E.

GREAT INDIAN PENINSULA RAILWAY COMPANY,
Bombay, 9th August, 1889.

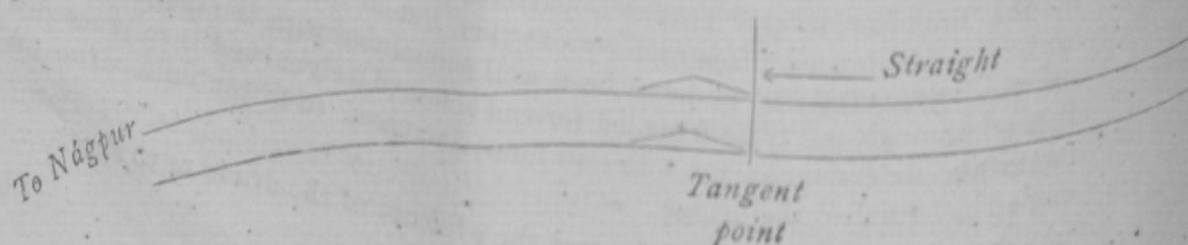
No. 7534.

THE AGENT,
G. I. P. Railway.

DEAR SIR,

In continuation of my No. 6816 of 20th ultimo, re accident to 197 Down Nágpur Passenger Train on the morning of 18th idem, I have to report further. My above was incorrect in two respects.

1. I stated the height of the bank where the accident occurred as being about 9 feet, whereas it is about 6 feet only.
2. I stated that our inspection special was followed by an Up Goods Train, and that the next to pass over the diversion was the passenger train to which the accident occurred. But two goods trains passed the place, one which followed soon after the inspection train on its upward journey, another down at about 10 P.M., and then the ill-fated passenger train.
3. The accident occurred on a diversion, from the old down line side over the up line side of a bridge which was being reconstructed in connection with the doubling. The gradient of the main line and of the diversion is 1 in 1,000 falling towards Nágpur. The line on either side of the diversion is straight for a long distance.
4. The accompanying diagram* will more clearly than words explain its position and those of the several points that will be referred to by me.
5. The diversion was formed partly (a to x and x to h) of the old material in the down line, iron rails laid in 1864, and pine sleepers with iron bearing plates laid in 1884; and (x to x') 30 feet steel rails and right and left pot sleepers, never until the diversion was opened, run over.
6. The diversion from (a) to (h) is 1,466 feet long. The sharpest curve between (a) and the bridge is about 3,000 feet radius, and such parts of the curves between the bridge and (h) as were not disturbed by the accident were found to be of not less than 2,500-foot radius.
7. The super-elevation of the outer rail is said to have been maintained at $2\frac{1}{2}$ " at the middles of the curves, decreasing of course towards their ends.
8. The road was fairly but not fully boxed up with excellent ballast.
9. The diversion was inspected and passed by Mr. Sivewright, Deputy Consulting Engineer to Government, on the 8th April last.
10. From the 8th April to the 2nd June there was a caution notice ordering speed of ten miles an hour between 327 $\frac{1}{4}$ and 328 $\frac{1}{4}$ mileage, which included this as well as another diversion. From the 2nd June the foregoing was cancelled and in its place was issued a caution notice ordering reduced speed to ten miles an hour at 327 $\frac{1}{4}$ mileage. A caution hand-signal was exhibited day and night.
11. On the 16th ultimo proceeding from Bhusáwal to Nágpur our inspection train ran slowly over the diversion and stopped, when Colonel Firebrace and I examined the newly finished bridgework, and he arranged for it to be tested three days later. Upon getting into my carriage at the rear of the train again and drawing slowly off the diversion, we continued for some little distance to hold a good view of it, and I certainly noticed nothing wrong with the curves.
12. Next evening on our return journey we ran over the diversion at a speed estimated by various members of our party as from thirty to forty miles an hour.
13. Colonel Firebrace, Mr. Jackson, and I were sitting in the rear verandah of my carriage which was at the tail of the train, and at the moment we left the straight and entered the curve we felt a severe jolt and at once discovered that



it had been produced by a most apparent "kink" at the tangent point (h) on accompanying diagram.

14. The above sketch in which the red lines indicate the "kink" does not greatly exaggerate what we, or to be more reserved, what I saw. In my own mind there is not the slightest doubt that the one single jolt which we felt occurred at the tangent point.

15. Excepting it there was no remarkable jolting, swaying, grinding or uneasy running over any other part of the diversion, and what little rocking there was I put down to the necessarily frequent changes of cant, emphasized by the speed at which we were travelling. I considered, too, that a train travelling at ordinary speed would only in a reduced degree feel the effect of the kink at the tangent point. Had I observed anything really seriously wrong, my telegram from the Nándúra Station would have been of a far more peremptory and urgent nature.

16. No. 197 Down Nágpur Passenger left Nándúra at 1.56 A.M. or four minutes late on 18th ultimo. According to the driver's evidence on approaching the diversion he whistled for a signal, and a green light was shown, whereupon he reduced speed to ten miles an hour on entering the diversion, and when his engine reached the straight of the diversion over the bridge and he had exchanged signals with the guards, he gave her steam again. When nearing the Nágpur end of the diversion running, he says, at about twelve or fifteen miles an hour, he felt the engine oscillate and then a severe jerk. He then shut off steam, but seeing that some carriages had left the road he put it on again, to keep the train straight, and then, as soon as he could, pulled up. The engine stopped at a point 936 feet beyond the spot where the first marks of derailment were found.

17. The engine, front brake van, four 3rd class carriages remained on the rails, then, attached to them with unbroken couplings, came four 3rd and one 2nd class carriages off the rails, then, after a gap of 355 feet, came one 1st class and one postal carriage half-way down the bank and almost on their sides, four 3rd class quite on their sides at bottom of bank, one 3rd class half-way down the bank, and one 3rd class, one road van and brake van derailed, but on the formation.

18. A joint enquiry into the accident was held, at which were present the District Engineer, the Assistant Locomotive Superintendent, the District Traffic Superintendent, and Mr. Sivewright, Deputy Consulting Engineer to Government.

19. Copies of the evidence taken and of the finding are herewith sent.

20. The exact mileage of the bridge is 327 miles 38 chains. The driver in evidence states that his line clear ticket bore the endorsement "speed 10 miles an hour at 327 $\frac{1}{4}$ " (which is equivalent to 327 miles 20 chains), and that he did not understand that he was to retain the speed of ten miles an hour after passing 327 $\frac{1}{4}$.

21. The inaccurate and insufficient wording of the caution notice, as given by the Engineer to the Traffic Department, might well have led drivers into error as to the precise place under protection, but in this case it did not do so, for the driver appears to have been well acquainted with the spot, as he says that on approaching it he whistled for and obtained a signal and then proceeded on to the diversion at ten miles an hour, increased to fifteen miles after his engine had reached the bridge.

22. The head guard corroborates the evidence of the driver as to speed.

23. Mr. Wright, the Traffic Inspector, was asleep, and can say nothing on this point.

24. Essoo Pandoba, signalman, says the train passed him at high speed and did not reduce speed as usual. This evidence is not of much value.

25. Judging by the positions of the engine and the rear brake after the accident, and the place of first derailment, I consider the train must have been running at a greater speed than stipulated in the caution notice, but to what extent we shall probably never be able to ascertain.

26. The Permanent-way Inspector who laid the diversion gives evidence that he examined the road testing its gauge, and the cant on curves three days before the accident, finding it all right. That during the time the diversion has been run over he has not found the gauge widen. That he has not found it necessary to re-spike any of the chairs, that he lorried over the place on the 17th about two hours before the special inspection train passed, and saw nothing wrong with the road.

27. This is all the oral evidence we have.

28. The condition of the road after the accident produced indisputable evidence that the first marks of wheels off the rails were found at a spot 464 feet from east abutment of bridge, *i.e.*, on a curve, the radius and cant of which are said to have been not less than 2,500 feet and $2\frac{1}{2}$ " respectively.

29. This fixes the spot as being between 120 and 150 feet on the Bhusawal side of the spot [(h) on diagram], where I in the inspection train felt the jolt or jerk on the evening of the 17th.

30. The road being destroyed for some distance on either side of (h) it was impossible to fix the exact position of the tangent point, hence the want of precise definition in regard to its distance from the point of derailment.

31. The first sign of a vehicle having got off was discovered by the middle of a rail on the left or outer side of the curve where the gauge was found $2\frac{1}{2}$ " wide.

From this point backwards the widening of gauge gradually decreased, until at a distance from it of *about* 30 feet (*i.e.*, up to 437 from abutment of bridge, see diagram) the gauge was found correct.

Forward from the first marks the chairs under the right hand or inner rail, were broken after passing three or four sleepers, and the rail was forced out, making the gauge 6 or 7 inches wide; but under the left or outer rail no chairs were broken, and the movement of the bearing plates on the sleepers plainly showed the widening as being $2\frac{1}{2}$ " at point of derailment, lessening to nothing at the 10th and 12th sleeper forward.

32. This gives the widening of gauge as extending for about a length of 60 feet, that is, 30 feet on either side of point of first marks of derailment, and leaving a length of at least 100' or 120' (according to whether the tangent point (h) was 120' or 150' from point of derailment) of the diversion true to gauge, and over which the foremost part of the train travelled safely. The five vehicles at the rear of the foremost portion were probably derailed when the rear portion was running down the bank and before the severance of the couplings.

33. At the enquiry the chairs were removed from those sleepers where the chairs under the left hand rail had moved more than an inch, and it was found that the spikes were bent, some of them to an angle of 45° , and the spike holes were elongated. Every spike was in its place, none were broken, only two were in any degree reduced in thickness by rust, yet all were bent, adducing an

incontestable fact that the wood of the sleepers had been hard enough to very strongly resist the action which caused the spreading of the road.

34. Several sleepers, including those under the rails where the carriages first left the road, were sawn in two and showed perfect soundness, so did those which had been crushed and split by the passage over them of derailed wheels. I have seen several of them.

35. At the enquiry the cant of the curve at the point where the first marks of derailment appeared was found to be less than 1".

36. There are not, I think, further details in connection with the construction of the diversion, description of the accident, on the conduct of those servants of the Company who are directly associated with it, that I need give you, and after quoting the finding of the joint enquiry, I will proceed to analyse such information as we have, and offer my opinion upon what I cannot but feel is a question of extreme complexity.

37. The District Engineer, Assistant Locomotive Superintendent, and District Traffic Superintendent, record as follows:—

"We find on examination of the road at the point of derailment that the gauge was gradually opened from zero to $2\frac{1}{2}$ inches on outer curve of diversion at east end of bridge at 327 miles $11\frac{1}{2}$ telegraph posts, at which point the train became derailed. There is absolutely no evidence to account for the widening of this gauge.

"We find that the speed was in excess of the cautious driving notice for this point; but we consider that this speed alone was not sufficient to account for this derailment, except on the supposition that some previous train had passed over this point at an excessive speed and strained the road."

38. There can be no doubt that the immediate cause of the accident was the widening of gauge due to the comparatively weak pine sleepers yielding to the pressure exerted by passing trains against the outer rail of the curve and to the bending of the spikes securing the chairs to them, and probably, but I will not say undoubtedly, to insufficiency of super-elevation of outer rail.

39. I believe the accident would not have occurred had a stronger class of sleeper been in the road.

40. I hope I may not be understood to cast any reflection upon the officers who are responsible for having used pine sleepers for this particular work.

41. Mr. Mallet, Consulting Engineer to Government, Central Provinces, who was on the spot soon after the accident occurred, said he would never have rejected the sleepers for such a work. We have satisfactory evidence that they were perfectly sound. The resistance that they offered to the bending spikes is of itself a great testimony of their soundness.

42. We have used, and I believe there are now in the road, pine sleepers which are subjected to strains even more severe than it was contemplated those in this diversion, under the cautious running notice, would have to endure.

43. Although in the light of recent events—a light which will hereafter guide me in the construction of diversions—I say that stronger sleepers would probably have prevented the accident, I cannot attribute to the officers, who in this case used pine, any blame. I think no Engineer would, under the circumstances, have rejected them.

44. Regarding the cant on the curves of the diversion, although I attach no great credence to the Inspector's assertion that he tested and found it

accurate, I may express opinion that our very fast special having traversed them safely justifies the impression that there could have been nothing seriously defective in either the alignment or cant of the curves, but that insufficiency of cant for trains running at very high speed may have accelerated the tendency of such to force the gauge.

45. In the finding the members of the enquiry insinuate that the special inspection train had initiated the defect which caused the accident.

46. The District Engineer has in most unqualified terms expressed such belief. He argues that the elongation of the spike holes and the cutting of the bearing plates along the surface of the sleepers had the appearance of having been affected by one action, or, as it were, one blow, and that there were no signs to show that the widening of gauge had been gradual and caused by successive blows imparted by many trains.

47. I cannot endorse this theory.

48. I, at the extreme rear of the train, felt but one jerk at a place 120 or 150 feet before reaching the spot where the derailment occurred, and I detected no defect on any other part of the diversion.

49. The Traffic Inspector, who was in one of the carriages of the special, has recorded that he noticed nothing unusual in passing over the diversion.

50. But, supposing the special had burst the road, would it not be more reasonable to suppose that one of the engines of the three trains that passed over the diversion would have dropped in where the gauge was wide instead of a light carriage?

51. Is it credible that a special conveying the Consulting Engineer to Government and the chief officials of the Railway, and the ill-fated passenger train, were the only one that traversed the diversion at high speed? I think not.

52. I am of opinion that the gauge had been gradually forced by many trains running at speed in excess of the limited ten miles an hour; that the increasing defect had not been detected by the Inspector; and because we have no evidence to prove that at the first point of derailment the gauge, though widened, was sufficiently so to allow a wheel to simply drop in between the rails, I think there is ground for suspicion that there may have been an accessory cause—perhaps a strong jerk or blow imparted by bad driving.

53. The damage to permanent-way was:—

- 11 Iron 24-feet rails bent.
- 279 Pine sleepers broken and split.
- 480 Ordinary chairs broken.
- 480 Bearing plates broken and split.
- 900 Spikes.
- 110 Fish-plates broken.
- 228 Fish-bolts broken.
- 480 Wooden keys broken.

Estimated value—R 1,460.

Yours truly,
(Signed) H. WENDEN
Chief Engineer.

No. 194 R. T.
GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
RAILWAY TRAFFIC.

Simla, the 30th May 1890.

Returns of Accidents on Indian Railways for the third quarter of 1889.

Read again—

Public Works Department Resolution No. 200 R. T., dated 10th March 1885.

"	"	"	"	"	282	"	"	18th	"	1886.
"	"	"	"	"	270	"	"	15th	"	1887.
"	"	"	"	"	379	"	"	23rd	"	1888.
"	"	"	"	"	0400	"	"	28th	"	1889.
"	"	"	"	"	0210	"	"	10th	"	Feb. 1890.

Read also—

Docket from the Director General of Railways, No. 83 Statistical, dated 8th May 1890, forwarding the Abstract Returns of Accidents to trains, &c., on the open lines of Railway in India, for the quarter ended 30th September 1889.

OBSERVATIONS—As compared with the average of the five* corresponding previous quarters, the number of accidents to trains, rolling-stock, permanent-way, &c., shows an increase of 86, or 11.44 per cent., with an increase of 2,416.75 miles, or 18.62 per cent. in the mean mileage open, and of 1,423,133 miles, or 13.57 per cent. in the train mileage. The following are the railways on which the more important fluctuations occurred:—

Railway.	Number of accidents.	ACCIDENTS.				TRAIN-MILEAGE.	
		Increase.	Decrease.	Percentage of increase.	Percentage of decrease.	Percentage of increase.	Percentage of decrease.
Rajputana-Malwa ...	78	...	16	...	17.02	1.83	...
Bengal-Nágpur ...	30	21	...	233.33	...	57.53	...
Southern Mahratta ...	42	16	...	61.54	...	70.38	...
Indian Midland ...	23	(a) 17	...	283.33	...	671.89	...
North Western ...	113	...	22	...	16.30	29.57	...
Oudh and Rohilkhand ...	19	...	11	...	36.67	20.36	...
Eastern Bengal ...	89	21	...	30.88	...	26.99	...
Burma ...	22	14	...	175.00	...	71.09	...
Madras ...	48	14	...	41.18	...	3.02	...
Bengal and North Western ...	22	11	...	100.00	...	33.15	...
His Highness the Nizam's Guaranteed.	34	22	...	183.33	...	60.29	...
Bhavnagar-Gondal-Junágarh-Portbandar.	24	20	...	500.00	...	62.11	...

2. The decreases on the Rajputana-Malwa and Oudh and Rohilkhand Railways, and the increases on the Southern Mahratta, Bengal and North Western and His Highness the Nizam's Guaranteed State Railways have mainly occurred under "Trains running over cattle on the line."

3. Of the increase of 21 accidents on the Bengal-Nágpur Railway, 8 appear under "Goods trains or parts of goods trains, engines, &c., leaving the rails," and 11 under "Slips in cuttings or embankments."

4. On the Indian Midland Railway the number of accidents has increased by 17, or 233.33 per cent., with an increase of 432.11 per cent. in the mean mileage worked and 671.89 per cent. in the train mileage. There is no noticeable variation under any particular head.

5. On the North Western Railway the number of accidents recorded under "Flooding of portions of permanent-way" has increased from 10 to 40, but some of the other heads showed decreases; the total number is less by 22. The

* Except where statistics for five quarters are not available.

(a) As compared with the corresponding quarter of the previous year.

principal decreases are 7 under "Goods trains or parts of goods trains, engines, &c., leaving the rails," 9 under "Trains running over cattle on the line" and 10 under "Failure of machinery, springs, &c., of engines."

6. On the Eastern Bengal State Railway the number of cases of "Goods trains or parts of goods trains, engines, &c., leaving the rails" has risen from 4 to 12, and that of "Flooding of portions of permanent-way" from *nil* to 12.

7. The Madras Railway shows an increase of 8 accidents under "Goods trains or parts of goods trains, engines, &c., leaving the rails," and of 6 under "Trains running over cattle on the line."

8. The increase on the Bhavnagar-Gondal-Junagarh-Porbandar Railway is mainly due to there being 15 cases of "Flooding of portions of permanent-way" against *nil*.

9. The casualties resulting from "Accidents to trains, &c.," were, among passengers and others, 31 injured, against 1 killed and 7 injured; and among servants, 3 killed and 9 injured, against 2 killed and 7 injured.

10. Of the casualties to passengers, 22 were injured, 6 seriously and the rest slightly, by the derailment of a passenger train at mileage 327½ on the Nagpur Branch of the Great Indian Peninsula Railway on the 18th July. Detailed reports of this accident are attached to the returns under review.

11. On the East Indian Railway, on the 6th July, 4 passengers were injured by a collision between a down passenger train and an up goods train at Barharwa, owing to the former, while proceeding to the station, having been allowed by the Jemadar to go on to the wrong line.

12. The following table exhibits the number of accidents under the different classes, due to "Accidents to trains, rolling-stock, permanent-way, &c.," and the number of persons killed and injured thereby, *vide* Tables Nos. 3 and 4:—

Serial No.	Causes of accidents.	Average of corresponding quarters of five previous years.*	THIRD QUARTER, 1889.				TOTAL ALL CLASSES.	
			Number	NUMBER OF PASSENGERS AND OTHERS.		NUMBER OF SERVANTS.	Killed.	Injured.
				Killed.	Injured.			
1	Collisions between passenger trains or parts of passenger trains	...	3	...	...	...	...	...
2	Collisions between passenger trains and goods, or mineral trains, engines and vehicles standing foul of the line	...	...	...	...	...	...	...
3	Collisions between goods trains or parts of goods trains	8	10	...	6	...	2	8
4	Collisions between light engines	13	21	...	...	2	1	2
5	Passenger trains or parts of passenger trains leaving the rails	2	4	...	...	1	...	1
6	Goods trains or parts of goods trains, engines, &c., leaving the rails	28	18	...	22	...	...	22
7	Trains or engines travelling in the wrong direction through points	84	99	...	...	2	...	2
8	Trains running into stations or sidings at too high a speed	13	8	...	...	...	...	...
9	Trains running over cattle on the line	1	3	...	...	...	...	...
10	" " over obstructions on the line	280	285	...	...	...	...	...
11	" " through gates at level crossings	17	23	...	1	...	...	...
12	The bursting of boilers of engines	12	10	...	1	...	1	2
12(a)	" " of tubes, &c., of engines	...	...	...	...	...	...	...
13	The failure of machinery, springs, &c., of engines	18	23	...	...	1	...	1
14	The failure of tyres	54	58	...	...	...	...	...
15	" wheels	2	...	...	...	...	...	...
16	" axles	...	...	...	...	...	...	...
17	" brake apparatus	10	16	...	...	...	...	...
18	" couplings	1	3	...	...	...	...	...
19	" tunnels, bridges, viaducts, culverts, &c.	68	62	...	...	...	...	...
20	Broken rails	...	1	...	...	...	...	...
21	The flooding of portions of permanent-way	8	9	...	...	...	...	...
22	Slips in cuttings or embankments	42	102	...	...	...	...	...
23	Fire in trains	16	24	...	...	...	...	...
24	Fire at stations, or involving injury to bridges or viaducts	23	9	...	...	...	...	...
25	Other accidents	2	1	...	...	...	...	...
	Total for 1889	50	46	...	1	...	2	3
	Total—Average of corresponding quarters of five previous years*	...	838	...	31	3	9	3
		...	752	1	7	2	7	3
								14

* Except where statistics for five quarters are not available for any line.

13. The principal variations occurred under "Passenger trains or parts of passenger trains leaving the rails," 18 against 28; "Goods trains or parts of goods trains, engines, &c., leaving the rails," 99 against 84; "The flooding of portions of permanent-way," 102 against 42; and "Fire in trains," 9 against 23.

14. The number of "Passenger trains or parts of passenger trains leaving the rails" was the largest on the Dibru-Sadiya Railway, being 10 out of a total of 18.

15. Under "Goods trains or parts of goods trains, engines, &c., leaving the rails" the number has increased from 1 to 9 on the Bengal-Nagpur Railway, 4 to 12 on the Eastern Bengal State Railway and 8 to 16 on the Madras Railway, and decreased from 14 to 7 on the North Western Railway, 8 to 2 on the South Indian Railway and 18 to 12 on the Dibru-Sadiya Railway.

16. The cattle accidents were most numerous on the South Indian Railway, the number reported being 41. The North Western and the Eastern Bengal State Railways come next with 31 accidents each. On the Rajputana-Malwa Railway there were 28 accidents of this class, but as compared with the average of the five corresponding previous periods there is a decrease on that Railway of 21.

17. Twelve cases of "Failure of axles," are recorded on the Rajputana-Malwa Railway.

18. The number of "Failures of couplings," *viz.*, 44, is very large on the Dibru-Sadiya Railway.

19. The increase of 60 accidents under "Flooding of portions of permanent-way" is principally due to the number having risen from 10 to 40 on the North Western Railway and from *nil* to 12 and 15 on the Eastern Bengal and Bhavnagar-Gondal-Junagarh-Porbandar Railways, respectively.

20. Of the 46 accidents classified as "Other accidents," 18 have been returned by the Bombay, Baroda and Central India Railway.

21. The casualties to passengers from causes other than accidents to trains, &c., *vide* Table No. 2, were—

Causes of accidents.	THIRD QUARTER, 1889.		AVERAGE OF CORRESPONDING QUARTERS OF FIVE PREVIOUS YEARS.*	
	Killed.	Injured.	Killed.	Injured.
1. From falling between carriages and platforms	...	2	1	1
2. Falling on to the platform, ballast, &c., when getting into or out of trains	...	1	1	2
3. Whilst crossing the line at stations...	...	...	1	...
4. By closing of carriage doors	...	...	...	1
5. Falling out of carriages during the travelling of trains	7	26	4	19
6. Other accidents	3	1	2	6
TOTAL	10	30	9	29

22. The accidents to servants in the employ of railways, or of contractors, whilst performing duties connected directly with the transit of passengers

* Except where statistics for five quarters are not available for any line.

and goods, from causes other than accidents to trains, &c., were as follows, *vide* Table No. 2 :—

Causes of accidents.	THIRD QUARTER, 1889.		AVERAGE OF CORRESPONDING QUARTERS OF FIVE PREVIOUS YEARS.*	
	Killed.	Injured.	Killed.	Injured.
1. During shunting operations ...	1	10	4	12
2. Falling off engines, vans, wagons, &c. ...	2	11	3	12
3. Coming in contact with over-bridges, &c., during the travelling of trains ...	1	3	...	...
4. Coming in contact, while shunting, with vehicles, &c., standing in adjoining lines ...	...	1	...	1
5. Getting on or off trains, engines, &c. ...	6	9	2	8
6. Whilst loading, unloading or sheeting ...	...	8	3	10
7. Whilst breaking, spragging, or choking wheels... ..	...	1	...	...
8. Whilst working at cranes or capstans ...	...	1	...	1
9. Whilst working on the permanent-way or in sidings ...	1	6	2	3
10. Whilst walking along the line on the way home, or to work ...	...	3	1	2
11. Whilst walking, crossing, or standing on the line ...	14	17	9	7
12. Whilst passing between vehicles ...	1	1	...	1
13. Whilst attending to the machinery of engines, cleaning them, &c. ...	...	8	...	4
14. Whilst attending to gates at level-crossings ...	1	1	1	1
15. Falling, or being caught between vehicles and platforms ...	...	1	1	1
16. Falling off ladders, scaffolds, platforms, &c. ...	1	3	1	5
17. By falling of lamps, wagon doors, timber, weights, &c. ...	2	6	1	7
18. Whilst coupling or uncoupling wagons ...	1	13	1	6
19. Miscellaneous ...	16	32	5	31
TOTAL ...	47	135	34	112

23. Of other persons killed and injured by running trains, &c., 1 was killed and 2 were injured whilst passing over the line at level crossings; 55 were killed and 17 injured whilst trespassing on the line; 12 committed suicide and 2 were injured in attempting to commit suicide; 8 were killed and 4 injured from miscellaneous causes.

* Except where statistics for five quarters are not available for any line.

24. The following table exhibits the total number of persons killed and injured from all causes over the whole Indian Railway system, as compared with the average of the corresponding quarters of five previous years, *vide* Table No. 1 :—

Causes of accidents.	THIRD QUARTER, 1889.		AVERAGE OF CORRESPONDING QUARTERS OF FIVE PREVIOUS YEARS.*	
	Killed.	Injured.	Killed.	Injured.
<i>Passengers.</i>				
From causes beyond their own control ...	5	31	2	...
From misconduct or want of caution ...	5	28	8	6
<i>Servants.</i>				
From causes beyond their own control ...	8	25	6	...
From misconduct or want of caution ...	42	119	30	100
<i>Others.</i>				
Whilst passing at level-crossings ...	1	2	4	2
Trespassers including suicides ...	67	19	55	14
Other persons ...	8	4	4	2
TOTAL ...	136	228	109	173
Total open mileage ...	15,396.75		12,980.00	
Total train-mileage ...	11,906,718		10,483,585	

25. In addition to the above, 6 persons are reported to have been killed and 50 injured in yards, workshops, &c., and 148 persons to have died in carriages and at stations from causes unconnected with the working of trains.

RESOLUTION.—The Government of India notices that there is a large increase on the Eastern Bengal State Railway, *viz*, from 4 to 12, in the number of cases of "Goods trains or parts of goods trains, engines, &c., leaving the rails;" also on the Madras Railway from 8 to 16, and on the Bengal-Nagpur Railway from 1 to 9.

The "Failure of axles" on the Rajputana-Malwa Railway is also again noticeable; out of a total number of 16 accidents of this nature 12 are on this railway.

The number of cases of "Failure of couplings" on the Dibru-Sadiya Railway is also very large, being 71 per cent. of the total.

ORDER.—Ordered that this Resolution, with the Abstract Returns, be communicated for information to the Local Governments, Administrations and Officers noted in the margin.

Ordered also that copies be forwarded for the information of Her Majesty's Government.

Ordered further that this Resolution, with the Abstract Returns, be published in the Supplement to the *Gazette of India*.

The Governments of Madras, Bombay, Bengal, the North-Western Provinces and Oudh, and the Punjab.
The Chief Commissioners of the Central Provinces, Burma, and Assam.
The Resident at Hyderabad.
The Agents to the Governor General for Central India, Rajputana, and Baluchistan.
The Director General of Railways.
The Consulting Engineers to the Government of India for Railways, Calcutta, Lucknow, and Central Division.

Documents accompanying.
Abstract Returns of Accidents for the third quarter of 1889.

M. C. BRACKENBURY, Major, R.E.,
Under Secretary.

* Except where statistics for five quarters are not available for any line.

Order No 951 R 4th July 1890

Communicated to the
Consulting Engineer for Rail.

Wagon with reference to his
Endorsement No 433 A, dated
30th October 1889 and Memo.
No 473, dated 22nd
November 1889.

2. Attention is directed to
so much of para 16 of the
Observations as refers to the
South Indian Railway and to
so much of para 1 of the
Resolution as refers to the
Madras Railway

J. G. L. R.
J. G. R.

Conf. Eng. for Rys.