# INTERSTATE COMMERCE COMMISSION

# TWENTY-FIRST ANNUAL REPORT

OF THE

# CHIEF INSPECTOR BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

FISCAL YEAR ENDED JUNE 30, 1932



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON: 1932

For sale by the Superintendent of Documents, Washington, D. C. - - - - Price 5 cents

# ANNUAL REPORT OF THE CHIEF INSPECTOR BUREAU OF LOCOMOTIVE INSPECTION

Остовев 1, 1932.

To the Interstate Commerce Commission:

In compliance with section 7 of the act of February 17, 1911, as amended, the Twenty-first Annual Report of the Chief Inspector, covering the work of the bureau during the fiscal year ended June 30, 1932, is respectfully submitted.

Summaries are given, by railroads, of all accidents, showing the number of persons killed and injured due to the failure of parts and appurtenances of locomotives, as reported and investigated under section 8 of the locomotive inspection law, and those reported to the Bureau of Statistics under the accident report act of May, 1910, and not reported to this bureau in accordance with the requirements.

The tables showing the number of accidents, the number of persons killed, and number injured, have been arranged to permit comparison with previous years as far as consistent. These tables also show the number of locomotives inspected, the number and percentage of those inspected and found defective, the number for which written notices for repairs were issued in accordance with section 6 of the law, and the total defects found and reported. The data contained therein cover all defects on all parts and appurtenances of locomotives found and reported by our inspectors, arranged by railroads.

Summaries and tables show separately accidents and other data in connection with steam locomotives and tenders and their appurtenances and accidents and other data in connection with locomotives other than steam.

Table I.—Reports and inspections—Steam locomotives

	Year ended June 30—									
	1932	1931	1930	1929	1928	1927				
Number of locomotives for which reports were filed.  Number inspected.  Number found defective.  Percentage inspected found defective.  Number ordered out of service.  Total number of defects found.	59, 110 96, 924 7, 724 8 527 27, 832	60, 841 101, 224 10, 277 10 688 36, 968	61, 947 100, 794 16, 300 16 1, 200 60, 292	63, 562 96, 465 20, 185 21 1, 490 77, 268	65, 940 100, 415 24, 051 24 1, 725 85, 530	67, 835 97, 227 29, 995 31 2, 539 112, 008				

Table II.—Accidents and casualties caused by failure of some part of the steam locomotive, including boiler, or tender

	Year ended June 30—								
	1932	1931	1930	1929	1928	1927			
Number of accidents Per cent increase or decrease from previous year Number of persons killed Per cent increase or decrease from previous year Number of persons injured Per cent increase or decrease from previous year	145 36. 9 9 43. 7 156 42	230 22 16 1 23 269 15. 9	295 17. 1 13 31. 6 320 17. 9	356 15 19 36. 6 390 15. 8	419 14. 1 30 17. 1 463 10. 4	488 14. 9 28 1 27. 3 517 21. 6			

<sup>&</sup>lt;sup>1</sup> Increase.

Table III.—Accidents and casualties caused by failure of some part or appurtenance of the steam locomotive boiler  $^{1}$ 

	Year ended June 30—										
	1932	1931	1930	1929	1928	1927	1915	1912			
Number of accidents	43 8 46	91 15 122	105 12 113	119 14 133	150 26 174	185 20 205	424 13 467	856 91 1, 005			

<sup>&</sup>lt;sup>1</sup> The original act applied only to the locomotive boiler.

 $\begin{tabular}{ll} \textbf{Table IV.--Number of casualties classified according to occupation---Steam loco-motive accidents} \\ \end{tabular}$ 

				Yes	ır ended	June 3	0			
	19	32	19	31	19	30	19	29	199	28
	Killed	In- jured	Killed	In- jured	Killed	In- jured	Killed	In- jured	Killed	In- jured
Members of train crews: Engineers	2	59 49 18 7	5 5	73 75 39 21 8	4 4 4	100 123 32 10 10	7 7 1	128 128 45 24 11	8 11 4	151 161 54 16 15
ployees: Boilermakers		1 5	1 2	3 4 3 5 4 6 6	1	1 3 1 3 2 2 3 8	1 2	5 2 1 1 3 1 5	3 2 1 1	5 4 1 1 2 2 10 8 12 23
Nonemployees		6	1			16		23	1	
Total	9	156	16	269	13	320	19	390	30	46

Table V.—Reports and inspections—Locomotives other than steam

	Year ended June 30—								
	1932	1931	1930	1929	1928				
Number of locomotive units for which reports were filed Number inspected	1, 274 1, 411 57 4 6 126	1, 242 1, 256 75 6 3 192	1, 135 1, 306 120 9 6 289	1, 071 1, 099 131 12 4 329	1, 034 1, 119 169 15 9 411				

 $\begin{tabular}{ll} \textbf{Table VI.--} Accidents \ and \ casualties \ caused \ by \ failure \ of \ some \ part \ or \ appurtenance \\ of \ locomotives \ other \ than \ steam \end{tabular}$ 

		Year e	nded Ju	ne 30—	
	1932	1931	1930	1929	1928
Number of accidents. Number of persons killed	2	5 1	3	1	4
Number of persons killed	2	5	3	1	3

 $\begin{tabular}{ll} \textbf{Table VII.--} Number\ of\ casualties\ classified\ according\ to\ occupation--- Locomotives \\ other\ than\ steam \end{tabular}$ 

				Yes	ar ended	l June 3	0—			
	19	32	19	31	19	30	19	29	193	28
	Killed	In- jured	Killed	In- jured	Killed	In- jured	Killed	In- jured	Killed	In- jured
Members of train crews: Engineers. Firemen. Brakemen. Roundhouse and shop em-		1	i	1 1 2		2 1		i		2
ployees: Inspectors Other roundhouse and shop employees Other employees		 1		1					1	1
Total		2	1	5		3		1	1	3

Table VIII.—Accidents and casualties resulting from failures of steam locomotives and tenders and their appurtenances

	T					37.			<b>.</b>	. 00					
	-					Ye	ar er	aded	June	30-	<del>-</del> 	-	1		
Part or appurtenance which caused accident		193	2		193	1	_	193	0		192	9		1928	3
accident	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Air reservoirs Aprons Arch tubes Ash-pan blowers	1		1	3 2		3	1			2		2 2	5 1		
Asin-pan diowers. Axles. Blow-off cocks. Boiler checks. Boiler explosions:	- 1		1	6 5 1		-	4		١ ^	7	-	8 10 1	7		. 8
A. Shell explosions  B. Crown sheet; low water; no contributory causes found.  C. Crown sheet; low water; con-	5	5	6	10	7	32	6	7	5	11	11	12	15	16	25
tributory causes or defects found.  D. Miscellaneous fire-box failures. Brakes and brake rigging	10	3		3 1 8 9	8	8 1 9 10	5 1 21 9	4	8 1 23 13 5	6 1 16 5	2	8 3 17 6	7 14 13	4	12 14 14
Crank pins, collars, etc	3		3 1	7 4 3		. 8	3 4 1 2		. 5	2 3 1 4		10 1 1 4	8 3 6 1		8 3 6
Cylinder heads and steam chests. Dome caps. Draft appliances. Draw gear. Fire doors, levers, etc. Flues. Flue pockets. Footboards. Gauge cocks. Grease cups.	1 1 2 4	1	1 2 4	2 13		2	1 1 8		. 8	3 6 4 7	i	3 6 4 7	1 1 2 8 17		1 1 2 2 8
Flue pockets Footboards Gauge cocks Grease cups	2 1		2	4		13 4 1	10 7 3		14 7 3	7 1 5		7 1 6	11		21 11 
Grease cups Grate shakers Handholds Headlights and brackets Injectors and connections (not includ-	1		7 4 3	8 6 1		8 6 1	18 5 2		18 5 2	16 10 2	1	16 9 1	25 12 3	i	25 12 2
ing injector steam pipes)	1 1 3 1		1 1 3 1	5 1 5 1		5 1 5 1	1 1		1 1	6 2 5 2		6 2 5 2	7 3 8 1		7 3 8 1
Pictore and pictor rode	1		1	5  12		5  12	2		3	4 2 1 23		4 2 1 23	2 1 	2	2 1
Plugs, arch tube and washout. Plugs in fire-hox sheets. Reversing gear Rivets. Rods, main and side. Safety valves. Sanders.	8		9	1 4 3		1 4 3	11 - 2		15 	3 14 3		17 3	$\begin{array}{c c} 1\\11\\1\\2\\\end{array}$	1	35 1 13 1 2
Sanders. Side bearings Springs and spring rigging Squirt hose Stay bolts Steam piping and blowers Steam valves	3 10 2		3 10 2	4 7 4 3		4 9 4	4 20 1 5		4 20 1 5	1 10 23 4 4		1 10 23 4 6	10 32 5 7	1  2 1	11 33 4
StudsSuperheater tubesThrottle glands	2		2	4 1 4 1		3 4 1 5	6 5		6 7	2 1		5 1	2 1 1 1		10 2 1 2 2
Throttle leaking Throttle rigging Trucks, leading, trailing or tender Valve gear, eccentrics and rods Water glasses			1 3 8 7	1 1 6		1 2 7 8	3 2 5 15		3 2 5 15	2 4 14 18		2 4 16 18	1 3 3 8 13		10 2 1 2 1 1 3 4 9 13 1
Water glasses Water-glass fittings Wheels Miscellaneous	1 29		3 29	8 2 1 49		2 1 50	3 63		1 64	1 8 71	1 2	1 16 69	1 5 84	 1	87
Total	145	9	156	230	16	269	295	13	320	356	19	390	419	30	463

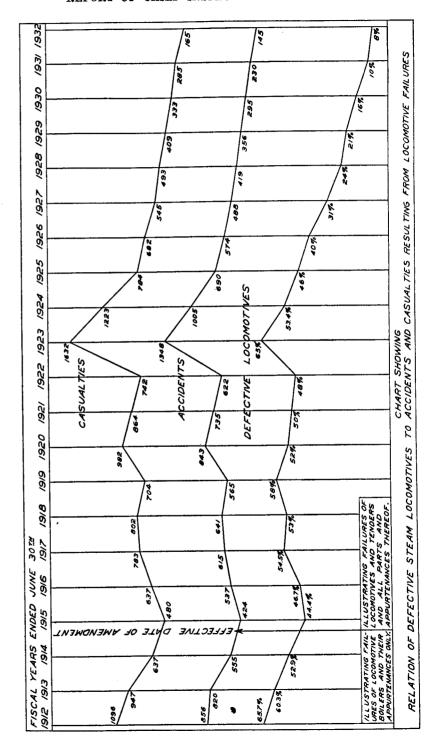


Table IX.—Accidents and casualties resulting from failures of locomotives other than steam, and their appurtenances

						Yea	reno	led J	une	30					
Part or appurtenance which caused		1932	:		1931			1930	)		1929			1928	
accident	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Circuit breakers Insulation Pantagraphs and trolleys Third-rail shoes Transformers Miscellaneous	1 1		1 1	1 1 3	1	1 4	1		1  2	1		1	1 1 2	1 	1 2
Total	2		2	5	1	5	3		3	1		1	4	1	3

Table X.—Number of steam locomotives reported, inspected, found defective, and ordered from service

Parts defective, inoperative or missing, or in viola-		Ye	ear ended	June 30	_	
tion of rules	1932	1931	1930	1929	1928	1927
1. Air compressors	417	481	873	1, 202	1, 282	1, 679
2. Arch tubes	54	60	87	104	103	1,078
3. Ash pans and mechanism	69	šĭ l	76	132	133	192
4. Axies	13	10	12	20	7	13
5. Blow-off cocks	144	191	325	442	469	650
6. Boiler checks.	214	263	<b>521</b>	761	914	1,043
7. Boiler shell	220	430	579	841	954	1,422
8. Brake equipment 9. Cabs, cab windows, and curtains		1, 923	2,706	3, 894	5, 214	6,572
10. Cab aprons and decks	851 262	1,484   415	3,066	2, 140	1,670	2,055
III. USD cards	162	211	710 226	1,005 305	852 378	1,086
12. Coupling and uncoupling devices	1 95	98	122	154	179	575 289
13. Crossheads, guides, pistons, and piston rods	763	856	1, 421	1, 887	2,088	2,602
14. Crown nous	50	96	95	129	164	2,002
15. Cylinders, saddles, and steam chests.	841	1, 265	2,311	3, 210	3, 264	4, 526
10. Cylinder cocks and rigging	376	411	848	967	1,007	1,634
117. Domes and dome cans	45	83	154	227	281	388
18. Draft gear	325	568	950	1, 310	1, 453	2,037
19. Draw gear	371	640	1,003	1,367	1,650	2, 210
20. Driving boxes, shoes, wedges, pedestals, and	001	005	1 050	1 000	1 000	<u>.</u>
braces 21. Fire-box sheets	821 235	925 341	1,359 471	1,993 657	1,990	2, 710
	120	187	254	334	730 464	796
23. Frames, tailpieces, and braces, locomotive	611	740	1, 271	1, 377	1,354	465
21. Tiames, tenuel	86	105	177	297	256	1, 682 264
20. UBILEES STO GRIDE TITINGS OF	156	192	290	309	461	721
20. Gauges and gauge fittings, steam	214	324	553	678	969	1, 425
27. Gauge cocks	330	415	783	1, 114	1, 413	2, 024
28. Grate snakers and fire doors	288	410	767	295	377	613
29. Handholds	382	562	865	1, 125	1,373	2, 285
30. Injectors, inoperative	31	55	103	86	93	84
31. Injectors and connections 32. Inspections and tests not made as required	1, 168	1,815	3, 275	4,484	5, 563	7, 188
33. Lateral motion	3, 801 237	4, 862 289	7, 456 372	9, 246 618	6,623	8, 889
34. Lights, cab and classification.	237 55	77	119	121	699 118	673
35. Lights, headlights	119	180	373	488	571	107
36. Lubricators and shields	119	176	312	423	500	835 746
37. Mud rings	166	318	445	636	822	1,073
38. Packing nuts	402	523	828	991	1, 265	1, 851
39. Packing, Diston rod and valve stem	444	706	1, 429	1,708	1,904	2, 214
40. Pilots and pilot beams	145	160	272	371	386	507
41. Plugs and studs	176	182	348	482	619	740
42. Reversing gear	202	299	579	788	967	1, 247
43. Rods, main and side, crank pins, and collars	1, 256	1, 520	2,488	3, 465	4, 152	5, 137
44. Safety valves	63 289	61	116 804	1,008	172	212
46. Springs and spring rigging	1,851	314 2. 161	3, 311	4, 557	1,031 4,939	1, 268
47. Squirt hose	96	184	313	387	478	5, 956 644
48. Stay bolts	181	293	395	542	590	631
49. Stay bolts, broken	552	938	1,098	1, 197	1,867	2, 373
			•			-,

Table X.—Number of steam locomotives reported, inspected, found defective, and ordered from service—Continued

Parts defective, inoperative or missing, or in viola-		Y	ear ended	June 30	-	
tion of rules	1932	1931	1930	1929	1928	1927
50. Steam pipes 51. Steam valves 52. Steps 53. Tanks and tank valves 54. Telltale holes 55. Throttles and throttle rigging 56. Trucks, engine and trailing 57. Trucks, tender 58. Valve motion 59. Washout plugs 60. Train-control equipment 61. Water glasses, fittings, and shields 62. Wheels 63. Miscellaneous—Signal appliances, badge plates, brakes (hand)  Total number of defects	587 108 434 648 766 520 599 13 676 603 325 27,832	512 226 676 732 1511 574 714 1, 059 497 815 750 418 36, 968	730 7399 1, 021 1, 426 1, 175 1, 141 1, 531 827 1, 281 1, 501 1, 025 60, 292	925 4771 1, 394 1, 717 174 1, 554 1, 605 2, 144 1, 087 1, 871 60 1, 816 1, 325 1, 101 77, 268	1, 020 1, 817 1, 941 1, 889 1, 914 2, 610 1, 262 2, 211 1, 609 1, 273 85, 530	1, 308 774 2, 440 2, 747 377 2, 233 2, 363 4, 114 1, 568 2, 786 2, 973 2, 119 1, 511 112, 008 67, 835 97, 227
Locomotives inspected Locomotives defective Percentage of inspected found defective Locomotives ordered out of service	7,724	101, 224 10, 277 10 688	100, 794 16, 300 16 1, 200	96, 465 20, 185 21 1, 490	100, 415 24, 051 24 1, 725	29, 995 31 2, 539

Table XI.—Number of locomotives other than steam reported, inspected, found defective, and ordered from service

Parts defective, inoperative or missing, or in violation of rules   1932   1931   1930   1929   1929   1920		Year ended June 30—									
Axles	Parts defective, inoperative or missing, or in violation of rules	1932	1931	1930	1929	1928					
Boiler			4	5		ŧ					
Cabs and cab windows.       6       10       14       39         Cab floors, sprons, and deck plates.       2       1       2       3         Controllers, relays, circuit breakers, and switch groups       7       7       7       10         Draft gear       13       11       17       36         Draw gear       2       1       1       16         Frames, tall pieces, and braces.       4       6       1       16         Frames, tall pieces, and braces.       2       3       15       1         Fuel tank, its piping and valves       3       3       15       1         Gauges and gauge fittings, air.       3       1       5       3         Gears and pinions.       3       4       4       7       5         High-tension equipment not properly guarded against accidental contact.       2       4       7       5         Inspections and tests not made as required.       23       41       45       40         Internal-combustion engine defects, including parts and appliances.       1       2       1         Insulation.       2       1       3       3       7       17         Jack shafts.       2       2	Boiler		23			32					
Cab floors, aprons, and deck plates       2       1       2       3         Controllers, relays, circuit breakers, and switch groups       3       1         Current-collecting apparatus       7       7       10         Draft gear       13       11       17       36         Draw gear       2       1	Cabe and ash windows	1 6				32					
Controllers, relays, circuit breakers, and switch groups         3         1         1           Corrent-collecting apparatus         7         10         7         10           Dratt gear         13         11         17         36           Draw gear         2         1         1         17         36           Driving boxes, shoes, wedges, pedestals, and pedestal braces         4         6         1         16         16         Frames, tailpieces, and braces         2         3           2         3           1         16         Frames, tailpieces, and braces         4         6         1         16         Frames, tailpieces, and braces         2         3         3         15         1         1         16         Frames, tailpieces, and braces         2         3         3         15         1         1         1         16         Frames, tailpieces, and braces         3         3         15         1 <td>Cab floors appears and deelt plates</td> <td>1 3</td> <td></td> <td></td> <td></td> <td>1</td>	Cab floors appears and deelt plates	1 3				1					
Current-collecting apparatus         7         10           Draft gear         13         11         17         36           Draw gear         2         1         1         17         36           Driving boxes, shoes, wedges, pedestals, and pedestal braces         4         6         1         16         16         1         16         17         10         10         16         16         16         16         17         10         16         16         16         16         16         16         16         16         16         17         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         16         17         16	Controllers releve circuit brookers and switch groups										
Draft gear	Current collecting apparetus	7				i					
Draw gear	Droft coor		11			41					
Driving boxes, shoes, wedges, pedestals, and pedestal braces.	Drow more	18	11			**					
Frames, talipieces, and braces Fuel tank, its piping and valves	Driving hoves shoes medges medestals and nedestal brosses		A		16	12					
Fuel tank, its piping and valves       3       3       15       1         Gauges and gauge fittings, air       3       1       5       3         Gears and pinions       3       4         High-tension equipment not properly guarded against accidental contact       2       4       7       5         Inspections and tests not made as required       23       41       45       40         Internal-combustion engine defects, including parts and appliances       1       2       1         Insulation       1       2       4       5         Insulation       2       4       5         Insulation       1       3       3       7       17         Insulation       2       4       3       7       17       1       1       2       1       3       3       3       1       5       4       4       3       7       17       1       1       1       3       1       3       1       3       4       4       3       1       3       4       4       3       7       17       1       1       1       2       1       1       1       2       1       1       1       2	Promos tallaisees, and brosses, pedesials, and pedesial praces	1 *			10	1					
Gauges and gauge fittings, air       3       1       5       3         Gears and pinions       3       4         High-tension equipment not properly guarded against accidental contact       2       4       7       5         Inspections and tests not made as required       23       41       45       40         Inspections and tests not made as required       23       41       45       40         Internal-combustion engine defects, including parts and appllances       1       2       2       2       1       3       3       1       5       40       1       3       1       45       40       41       40	Fuel tenk its pining and polyes					į					
Gears and pinions	Course and sauge 6ttings of	3									
High-tension equipment not properly guarded against accidental contact.    A	Charges and gauge ittings, air	3				- 1					
Central Contact	Wigh tangian agginment not named a granded aggingt aggi				*	,					
Inspections and tests not made as required.	mign-tension equipment not properly guarded against acci-			7		29					
Internal-combustion engine defects, including parts and appliances   1   2	Transactions and tests met medical required					84					
ances	Inspections and tests not made as required		41	40	***	01					
Insulation			1	9		11					
Jack shafts.       2       4       5         Lateral motion, wheels.       2       1       3       3         Lights, cab and classification       4       3       7       17         Lights, headlights       1       3       3       5         Meters, volt and ampere.       2       2       1         Motors and generators.       1       10       23       11         Pilots and pilot beams.       2       4       1         Plugs and studs (boiler, other than fusible plugs)       2       4       1         Quills.       1       1       1         Rods, motor, main and side, drive shafts       1       1       1         Sanders.       4       8       8         Springs and spring rigging, driving and truck       9       10       21       24         Steam pipes.       1       2       2       2         Switches, hand-operated, and uses       1       2       2	Ingulation										
Lateral motion, wheels	Taok shofts										
Lights, eab and classification       4       3       7       17         Lights, headlights       1       3       3       5         Meters, voit and ampere       2       2       1         Motors and generators       1       10       23       11         Pilots and pilot beams       2       4       1         Plugs and studs (boiler, other than fusible plugs)       1       1         Quills       1       1       1         Rods, motor, main and side, drive shafts       1       1       1         Sanders       4       8       8         Springs and spring rigging, driving and truck       9       10       21       24         Steam pipes       1       2       2         Switches, hand-operated, and uses       1       2	Totagal motion whose					2					
Lights, headlights       1       3       3       5         Meters, volt and ampere       2       2       1         Motors and generators       1       10       23       11         Plugs and pilot beams       2       4       1         Plugs and studs (boiler, other than fusible plugs)       1       1         Rods, motor, main and side, drive shafts       1       1         Sanders       4       8       8         Springs and spring rigging, driving and truck       9       10       21       24         Steam pipes       1       2       2         Switches, hand-operated, and fuses       1       2	Lights sah and electification	1 1				10					
Meters, volt and ampere	Lights, can and classification	1 7				Î					
Motors and generators	Maters welt and amners	1 *				•					
Pilots and pilot beams.	Motors and concretors					10					
Plugs and studs (boiler, other than fusible plugs)       1         Quills       1         Rods, motor, main and side, drive shafts       1       1         Sanders       4       8       8         Springs and spring rigging, driving and truck       9       10       21       24         Steam plpes       1       1       2         Switches, hand-operated, and fuses       1       2	Pilote and rilet beams					1					
Quills       1         Rods, motor, main and side, drive shafts       1       1         Sanders       4       8       8         Springs and spring rigging, driving and truck       9       10       21       24         Steam pipes       1       1       1       2         Switches, hand-operated, and tises       1       2       2	Plugg and study (hailon other than fusible plugg)					ì					
Rods, motor, main and side, drive shafts.	Onille					,					
Sanders       4       8       8         Springs and spring rigging, driving and truck       9       10       21       24         Steam pipes       1       1       2         Switches, hand-operated, and fuses       1       2						2					
Springs and spring rigging, driving and truck   9   10   21   24						12					
Steam pipes 1 2		0				10					
Transformers, resistors, and rheostats 2 2	Steam nince	, ,	1 4	-11	_ 4	10					
Transformers, resistors, and rheostats 2	Switches hand operated and fuces		†								
A GALINO HOLD, I GOLOVO D. BHILL I HEXISTALS	Transformers resistors and phasetate					ì					
Trucks 5 11 11 14	Trucks	1 5		11		10					

Table XI.—Number of locomotives other than steam reported, inspected, found defective, and ordered from service-Continued

Parts defective, inoperative or missing, or in violation of rules		Year e	nded Ju	ne 30—-	
Take detective, inoperative of missing, or in violation of rules	1932	1931	1930	1929	1928
Water glasses, fittings, and shields	1				
Wheels. Whistles, bells, and train-signal system. Miscellaneous.	11 9	12 2 16	5 1 26	6 1 20	17 4.
Total defects	126	192	289	329	411
Locomotive units reported	1, 274 1, 411 57 4 6	1, 242 1, 256 75 6 3	1, 135 1, 306 120 9 6	1, 071 1, 099 131 12 4	1, 034 1, 116 169 18

# INVESTIGATION OF ACCIDENTS AND GENERAL CONDITION OF LOCOMOTIVES

All accidents reported to the bureau as required by the law and rules were carefully investigated and appropriate action taken to prevent recurrences as far as possible. Copies of accident investigation reports were furnished to parties interested when requested, and otherwise used in our effort to bring about a diminution in the number of such accidents.

During the year 8 per cent of the steam locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before being put into use. However, the drastic economies now being practiced by the carriers, together with increasing traffic, will require energetic action on our part if the current conditions are to be maintained.

The decrease in accidents and casualties brought about by decrease in defective locomotives, and the converse, are illustrated graphically by the chart on page 5.

Table VIII shows the various parts and appurtenances of steam locomotives and tenders which through failure have caused serious and fatal accidents. If the information contained in this table is taken advantage of and proper inspection and repairs made in accordance with the requirements of the law and rules many accidents will be avoided.

Detailed results of our inspections of steam locomotives of each carrier are shown in Table XII, and a comparison of condition of locomotives over a period of years is shown in Table XIII. It will be noted from Table XIII that some of the carriers are maintaining their locomotives in such condition as to meet the requirements of the law and the rules, while others were found to be seriously delinquent.

#### BOILER EXPLOSIONS OR CROWN-SHEET FAILURES

There was a decrease of 46.1 per cent in the number of crown-sheet failures, a decrease of 46.6 per cent in the number of persons killed, and a decrease of 75 per cent in the number of persons injured from this cause as compared with the previous year.

# EXTENSION OF TIME FOR REMOVAL OF FLUES

Six hundred and forty-four applications were filed for extensions of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 31 of these cases the condition of the locomotives was such that extensions could not properly be granted. Fifty-seven were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. Fifty-three extensions were granted after defects disclosed by our investigations had been repaired. Forty-nine applications were canceled for various reasons. Four hundred and fifty-four applications were granted for the full periods requested.

#### SPECIFICATION CARDS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 343 specification cards and 4,753 alteration reports were filed, checked, and analyzed. These reports are necessary in order to determine whether or not the boilers represented were so constructed or repaired as to render safe and proper service and whether the stresses were within the allowed limits. Corrective measures were taken with respect to numerous discrepancies found.

Under rules 328 and 329 of the Rules and Instructions for Inspection and Testing of Locomotives Other Than Steam, 50 specifications and 6 alteration reports were filed for locomotive units and 25 specifications and 13 alteration reports were filed for boilers mounted on locomotives other than steam. These were checked and analyzed and corrective measures taken with respect to discrepancies found.

# SUITS FOR PENALTIES-CASES PENDING AT THE BEGINNING OF THE YEAR AND DISPOSED OF DURING THE YEAR

U. S. v. Chicago, Springfield & St. Louis Railway Co., southern district of Illinois, involved 30 counts for use of locomotives while defective and in violation of rules. Judgment on 6 counts for \$600: 24 counts dismissed.

#### APPEALS

No formal appeal by any carrier was taken from the decisions of any inspector during the year.

A. G. PACK, Chief Inspector.

ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF STEAM LOCOMOTIVES AND TENDERS AND THEIR APPURTE-NANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1932, BY ROADS

[A star (\*) indicates accidents taken from records of the Bureau of Statistics of the Interstate Commerce Commission. A double star (\*\*) indicates accidents not properly reported, as required by rules 55 and 162. A complete investigation, therefore, could not be made, inasmuch as the bureau was not apprised of the accidents in sufficient time after they occurred to permit them to be properly investigated.]

#### ATCHISON, TOPEKA & SANTA FE RAILWAY:

August 12, 1931, locomotive 3287, near Dallas City, Ill. Piston rod broke at

old fracture; 1 injured.

\*October 7, 1931, locomotive 3146, Knightsen, Calif. Pin lost out of cylinder cock rod connection, permitting rod to drop and catch on ties, causing cylinder cock lever in cab to move back suddenly and strike engineman; 1 injured.

# Two accidents; 2 injured. ATLANTIC COAST LINE RAILROAD:

October 19, 1931, locomotive 1011, Lakeland, Fla. Employee's eye injured by piece of wire protruding from water cooler fastening; water cooler was not secured according to company's standard; 1 injured.

One accident: 1 injured.

#### BALTIMORE & OHIO RAILROAD:

August 13, 1931, locomotive 4558, McCool, Ind. Insufficient clearance between grate shaker lever and left back wing of cab; grate shaker fulcrum bracket holes worn and fulcrum pin diameter less than company's standard; 1 injured.

\*\*October 5, 1931, locomotive 1054, Baltimore, Md. Power reversing gear operated violently when main reservoir cut-out cock was opened, resulting in injury to an employee; reverse gear slide valve was leaking and had 1/4-inch lost motion on stem; 1 injured.

October 9, 1931, locomotive 864, near Polk, W. Va. Reverse lever unlatched and went to forward corner; teeth on reverse lever latch and quadrant worn;

\*\*October 29, 1931, locomotive 5219, Grafton, W. Va. Handrail on side of locomotive broke at bend near front end fastening, caused by old fracture comprising approximately 95 per cent of cross-sectional area; 1 injured.

\*\*November 5, 1931, locomotive 7211, near Connellsville, Pa. Lubricator did not work properly; employee injured while attempting to oil right high pressure cylinder through relief valve; I injured.

January 10, 1932, locomotive 4103, Dayton, Ohio. Drifting valve rod was

bent, causing rod to be difficult to operate; 1 injured.

\*\*May 28, 1932, locomotive 1156, Wheeling, W. Va. Injured while replacing

burned-out headlight bulb; 1 injured.

June 20, 1932, locomotive 5037, Allison Park, Pa. Crown sheet failure caused by overheating due to low water; 2 killed.

Eight accidents; 2 killed, 7 injured.

# BOSTON & ALBANY RAILROAD:

\*\*July 22, 1931, locomotive 41, Chatham, N. Y. Teeth on throttle lever latch and quadrant worn and would not hold lever in desired position; throttle reported on July 3, 6, 10, 11, 14, 18, and 19; 1 injured.

\*\*February 18, 1932, locomotive 602, Pittsfield, Mass. Cover over injector in front of cab not fastened, permitting cover to interfere with engineer's vision through front window; 1 injured.

Two accidents; 2 injured.

#### BOSTON & MAINE RAILROAD:

July 16, 1931, locomotive 3651, Deerfield, Mass. Struck by valve stem guide oil cup which was thrown from locomotive; oil cup not properly applied; 1 injured. August 9, 1931, locomotive 3600, Durham, N. H. Reverse lever unlatched and moved into forward gear a few notches at a time; valves very dry; 1 injured. September 26, 1931, locomotive 3243, Boston, Mass. Air compressor reversing valve rod broke; 1 injured.

October 7, 1931, locomotive 3001, North Adams, Mass. Fire tube failed inside of front flue sheet; tube had been heavily rolled and reduced in thickness; tube was practically stopped up with soot and dirt; flues reported leaking on October

3 and 4; 1 injured.

May 5, 1932, locomotive 4018, Nashua, N. H. Power reverse gear hand wheel spun when attempt was made to adjust cut-off; 1 injured.

Five accidents: 5 injured.

#### CENTRAL OF GEORGIA RAILWAY:

May 9, 1932, locomotive 331, Savannah, Ga. Section of dome cap broke loose and was blown from locomotive; old fracture in cast-iron dome cap extending approximately five-eighths inch downward from top face of casting and 60 per cent of circumference at inner edge of gasket seat; 1 injured.

\* June 18, 1932, locomotive 472, Gold Ridge, Ala. Whistle valve spring

broke, permitting whistle to blow continuously; 1 injured.

Two accidents: 2 injured.

# CENTRAL RAILROAD OF NEW JERSEY:

November 5, 1931, locomotive 611, Jersey City, N. J. Rod supporting drop seat in cab broke; metal at point of failure of inferior quality; 1 injured. One accident: 1 injured.

# CHESAPEAKE & OHIO RAILWAY:

\* September 24, 1931, locomotive 1521, Powellton, W. Va. Cylinder head

blew out; 1 injured.

\*\* January 19, 1932, locomotive 3010, Marion, Ohio. Train parted between tender and first car; coupler at rear of tender only 301/4 inches high; 1 injured. February 9, 1932, locomotive 1304, Cincinnati, Ohio. Fire tube broke off next

to front flue sheet due to being badly grooved; 1 injured. Three accidents: 3 injured.

CHICAGO & NORTH WESTERN RAILWAY:

February 24, 1932, locomotive 1657, near Chemung, Ill. Main rod broke, due to old fracture, and broken rod punctured outside and inside fire-box sheets; 1 injured.

One accident; 1 injured.

# CHICAGO, BURLINGTON & QUINCY RAILROAD:

\*\* January 22, 1932, locomotive 5350, Red Cloud, Nebr. Grate shaker bar broke at old fracture covering approximately 75 per cent of cross-sectional area;

May 24, 1932, locomotive 5140, Jacksonville, Ill. Arm rest gave way due to

not being securely attached to brackets; 1 injured.

Two accidents; 2 injured.

# CHICAGO GREAT WESTERN RAILROAD:

\* July 30, 1931, locomotive 859, Oelwein, Iowa. Valve stuck in valve chamber due to tight fit of bull rings; 1 injured.

\*\* November 1, 1931, locomotive 758, Clarion, Iowa. Shaker bar slipped off post; shaker bar loose fit on post; 1 injured.

\*\* February 8, 1932, locomotive 729, Almoral, Iowa. Locomotive was dispatched with tender brake pull rod disconnected from front truck lever; 1 injured. \*\* April 22, 1932, locomotive 867, Arispe, Iowa. Vertical handhold at right back corner of cab broke through bolt hole; handhold reported cracked on April 20 and proper repairs not made; 1 injured.

\*\* May 14, 1932, locomotive 458, Waterloo, Iowa. Right front driving spring hanger broke at old fracture extending outward from gib hole; 1 injured.

June 13, 1932, locomotive 715, Sumner, Iowa. Locomotive moved ahead while employee was standing on eccentric rod to adjust the power reverse piston rod packing, causing his foot to be caught between eccentric rod and crank; power reverse piston rod packing leaking; 1 injured.

Six accidents: 6 injured.

# CHICAGO, ROCK ISLAND & PACIFIC RAILWAY:

\*\* September 12, 1931, locomotive 2663, Enid, Okla. No clearance between operating handle of ash pan slides and ash pan when slides were closed; employee's hand injured while closing ash pan slides; 1 injured.

September 26, 1931, locomotive 939, near Coburn, Mo. Squirt hose burst; 1 injured.

\* October 2, 1931, locomotive 253, Topeka, Kans. Spring hanger broke; 1

Three accidents: 3 injured.

# CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA RAILWAY:

December 9, 1931, locomotive 144, near Wayne, Neb. Side rod broke; material defective, resulting in progressive fracture on bottom side of rod: 1 injured. One accident; 1 injured.

# CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY:

April 11, 1932, locomotive 6073, near Keensburg, Ill. Reverse lever got away from engineman and jerked forward catching his leg between lever and automatic brake valve; insufficient clearance between lever and brake valve; 1 injured. One accident: 1 injured.

#### COLORADO & SOUTHERN RAILWAY:

\*\* July 21, 1931, locomotive (C. B. & Q.) 6158, Pueblo, Colo. Insufficient clearance between grate shaker lever and back board of cab due to excessive wear of the fulcrum lever on shaft; 1 injured.

One accident: 1 injured.

# DELAWARE & HUDSON RAILROAD:

February 14, 1932, locomotive 95, Mechanicville, N. Y. Injector steam pipe spanner nut broke while being tightened, due to having been mutilated by use of a sharp tool; 1 injured.

April 11, 1932, locomotive 1052, Morrisonville, N. Y. Air hose between loco-

motive and tender burst where worn thin; 1 injured.

\*\* June 1, 1932, locomotive 999, near Plattsburg, N. Y. Squirt hose valve opened due to valve stem packing nut being loose; I injured.

June 23, 1932, locomotive 898, near Plymouth Junction, Pa. Insufficient clearance between cab overhang and handhold on tender; 1 injured.

Four accidents: 4 injured.

# DELAWARE, LACKAWANNA & WESTERN RAILROAD:

July 2, 1931, locomotive 324, Jersey City, N. J. Squirt hose burst; hose badly worn at point of failure: 1 injured.

July 17, 1931, locomotive 2122, Kingsland, N. J. Squirt hose pulled off

defective nipple; 1 injured.

\* January 10, 1932, locomotive 2230, Moscow, Pa. Main rod strap bolts broke permitting strap to loosen and main rod to drop; 1 injured.

Three accidents: 3 injured.

### DENVER & RIO GRANDE WESTERN RAILROAD:

July 17, 1931, locomotive 1169, Salt Lake City, Utah. Fire hose blew off at branch pipe connection; 1 injured.

\*\*November 5, 1931, locomotive 962, Salida, Colo. Reverse gear difficult to

operate: reversing gear reported on November 3, 4, 5 (two times), 6, and 7;

May 25, 1932, locomotive 3606, Roper, Utah. Insufficient clearance between tender locker door, when open, and back of cab when locomotive moved around curve: 1 injured.

Three accidents; 3 injured.

#### ERIE RAILROAD:

\*\*July 4, 1931, locomotive 2943, Cleveland, Ohio. While standing on apron at left gangway employee's toe was fractured due to being caught between apron and cab floor as locomotive moved around curve; 1 injured.

September 16, 1931, locomotive 3026, Graham, N. Y. Crown sheet failure caused by overheating due to low water; top end of water glass closed by rubber

gasket, due to water glass not being properly assembled; 3 killed, 3 injured.
\*September 17, 1931, locomotive 2745, Passaic, N. J. Whistle rope broke;

1 injured.

October 5, 1931, locomotive 3315, Susquehanna, Pa. Main crank pin worked loose, bending eccentric rod and causing damage to reversing gear; valves were

reported out of square on day prior to accident; 1 injured.

March 23, 1932, locomotive 3321, Secaucus, N. J. Power reverse wheel spun when forced while reverse gear was being moved into backward motion; bolt that secured upper end of inside radius bar to reverse yoke, left side of locomotive, had worked out and fouled on gear connecting rod; cotter, nut, and collar missing from bolt; reversing gear reported working hard on February 21, 29, March 3, 5, 16, 21, and 22; 1 injured.

May 30, 1932, locomotive 3003, Huntington, Ind. Tubular water glass burst; 1 injured.

Six accidents: 3 killed, 8 injured.

# FLORIDA EAST COAST RAILWAY:

April 20, 1932, locomotive 818. Dania, Fla. Air hose at rear of tender burst, applying brakes in emergency; hose defective; 1 injured. One accident: 1 injured.

# GREAT NORTHERN RAILWAY:

\*September 15, 1931, locomotive 3030, Fergus Falls, Minn. Grate shaker bar slipped off post, due to improper fit: 1 injured.

\*\*September 25, 1931, locomotive 3392, Trego, Mont. Vestibule separated from cab rubbing surface while locomotive was on a curve, allowing employee's hand to be placed between them and injured when they closed; 1 injured.

\*\*March 20, 1932, locomotive 2512, Shelby, Mont. Injured by steam leaking

from a broken stay bolt: 1 injured.

Three accidents: 3 injured.

# GULF. COLORADO & SANTA FE RAILWAY:

\*\*July 30, 1931, locomotive (A. T. & S. F.) 1903, Longview Junction, Tex. Driving brake beam hanger pin broke due to defective metal in pin; 1 injured. \*\*January 26, 1932, locomotive (A. T. & S. F.) 3533, Milano, Tex. Bell cord broke: 1 injured.

\*\*June 8, 1932, locomotive (A. T. & S. F.) 3917, Heidenheimer, Tex. Driving

wheel brake beam broke: 1 injured.

Three accidents: 3 injured.

# HOUSTON BELT & TERMINAL RAILROAD:

November 17, 1931, locomotive 1, Houston, Tex. Crown sheet failure caused by overheating due to low water; 2 injured. One accident; 2 injured.

# ILLINOIS CENTRAL RAILROAD:

\*July 8, 1931, locomotive 2456, Haves, Ill. Locomotive tire broke; old fracture under flange; 3 injured.

\*\*September 19, 1931, locomotive 426, Water Valley, Miss. Water glass burst: 1 injured.

\*February 9, 1932, locomotive 1726, McComb, Miss. Water glass burst;

February 16, 1932, locomotive 1096, Memphis, Tenn. Cab apron did not provide for clearance between the apron and tank while moving around a curve: 1 injured.

\*February 16, 1932, locomotive 3530, Markham, Ill. Water glass burst; 1 injured.

\*\*April 9, 1932, locomotive 582, Louisville, Ky. Employee's toes were caught between cab apron and running board due to running board extending over apron and having an angle iron on its edge which reduced the clearance between running board and cab apron; 1 injured.

Six accidents; 8 injured.

#### INTERNATIONAL-GREAT NORTHERN RAILROAD:

July 5, 1931, locomotive (M. P.) 1312, Palestine, Tex. Fire door did not close properly on account of fire-door foot-valve leaking and both packing leathers in operating cylinders defective; 1 injured.

March 27, 1932, locomotive (N. O. T. & M.) 935, Fort Worth, Tex. Employee's leg caught between reverse lever and seat box account of no clearance

between top edge of seat box and reverse lever; 1 injured.

May 18, 1932, locomotive 1110, Mertens, Tex. Employee burned while removing fallen brick from fire box; brick arch reported defective on May 5, 8, 9, 12, 15, and 18; 1 injured.

Three accidents; 3 injured.

#### LEHIGH VALLEY RAILROAD:

September 1, 1931, locomotive 850, Port Bowkley Pa. Driving brake hanger pin broke at old defect comprising approximately 20 per cent of cross-sectional area: 1 injured.

September 30, 1931, locomotive 2050, East Buffalo, N. Y. Broken reducedbody radial stay blew out of crown sheet while being calked under pressure. The stay broke at fillet at wrapper-sheet end at old fracture covering approximately 75 per cent of cross-sectional area; threads on tapered head were badly worn and

head of bolt had been heavily hammered in attempts to stop leakage; 1 injured.

\*\*February 29, 1932, locomotive 4003, Newark, N. J. Top rung of rear-end ladder failed causing employee to fall to the ground; one end of rung showed old fracture through fillet joining reduced section to tread and the other end showed old fracture covering approximately 30 per cent of cross-sectional area of fillet; ladder rung reported loose on February 15; 1 injured.

Three accidents: 3 injured.

# Los Angeles & Salt Lake Railroad:

December 19, 1931, locomotive 5509, Cima, Calif. Superheater flue broke off near back flue sheet due to having been grooved to less than one-sixteenth inch in thickness for its entire circumference; I injured.

One accident: 1 injured.

#### LOUISVILLE & NASHVILLE RAILROAD:

July 25, 1931, locomotive 403, Verona, Ky. Fusion welded reinforcing on conveyor screw failed, preventing stoker from operating properly; stoker reported on July 20, 21, 22, 23, and 24, the report for July 24 stating "Stoker in bad shape, will hardly run at all." Condition of stoker was also verbally reported to foreman at Louisville, Ky., when en route on this trip, but locomotive was permitted to leave this terminal without repairs being made; 1 injured.

April 17, 1932, locomotive 1869, near Dudley, Ky. Crown sheet failure caused

by overheating due to low water; 2 injured.

Two accidents: 3 injured.

#### MAINE CENTRAL RAILROAD:

\*\*May 13, 1932, locomotive 373, Bangor, Me. Grate shaker lever slipped off post due to improper fit; 1 injured. One accident; 1 injured.

# MICHIGAN CENTRAL RAILROAD:

March 29, 1932, locomotive 8212, Detroit, Mich. Superheater flue broke at safe end weld due to having been overheated in welding; I injured. One accident; 1 injured.

# MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE RAILWAY:

January 13, 1932, locomotive 9, Drake, N. Dak. Clevis pin in operating mechanism of coupler on front end of locomotive broke or lost out: 1 injured.

April 19, 1932, locomotive 701, Rogers, N. Dak. Right go-ahead eccentric blade pin failed. On previous trip the eccentric strap bolt failed and proper repairs were not made, resulting in improper alignment of blade pin with link, which caused pin to heat excessively and sieze in bushing; 1 injured.

Two accidents: 2 injured.

# NASHVILLE, CHATTANOOGA & ST. LOUIS RAILWAY:

September 4, 1931, locomotive 391, Paris, Tenn. Bolt lost out of front end of cylinder cock slide rod connecting link, permitting link to drop and catch on ground or ties, causing cylinder cock lever in cab to fly back and strike engineer when engine made backward movement; 1 injured.

November 1, 1931, locomotive 555, near Wartrace, Tenn. Air compressor failed, causing application of brakes; air compressor reversing valve worn; 1

injured.

Two accidents; 2 injured.

### NEW YORK CENTRAL-LINES EAST:

November 27, 1931, locomotive 800, near Rome, N. Y. Loss of water in closed boiler circuit caused overheating and failure of tubes in fire box: 1 injured.

April 25, 1932, locomotive 5202, Palmyra, N. Y. Reverse gear wheel did not operate valves in the usual manner, and when forced the operating wheel kicked back, causing injury to the engineman; left front cylinder packing ring broken obstructed the valve movement; 1 injured.

\*\*May 19, 1932, locomotive 2735, Geneva, N. Y. Undesired emergency application of brakes, caused by defective vent valve; 1 injured.

June 12, 1932, locomotive 2768, Utica, N. Y. Train line pipe broke off at the base of ball in flexible joint connection between locomotive and tender, causing emergency application of the brakes; pipe not of sufficient thickness; 2 injured. Four accidents; 5 injured.

# NEW YORK CENTRAL-LINES WEST:

\*October 9, 1931, locomotive 2494, Toledo, Ohio. Locomotive derailed due to badly worn flange on engine truck wheel; 3 injured.

One accident; 3 injured.

# NEW YORK, CHICAGO & ST. LOUIS RAILROAD:

December 10, 1931, locomotive 60, Cleveland, Ohio. Floor board broke off; board was of yellow pine and failed about flush with extension over edge of steel cab floor; 1 injured.

June 26, 1932, locomotive 910, near Sims, Ind. Drawbar pin broke, due to defective material, and safety chains failed due to improper welding of links;

1 killed.

Two accidents: 1 killed, 1 injured.

# NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

February 6, 1932, locomotive 2405, Cranston, R. I. Gauge glass of bull's-eye lubricator broke; lubricator gauge glass gaskets badly deteriorated, and nut tightened in attempt to stop leakage, causing gauge glass to be held rigidly between brass parts; "Sight glass leaks bad at lubricator" was reported on February 5 and proper repairs were not made; 1 injured.

March 17, 1932, locomotive 3341, New Haven, Conn. Fire tube failed at

defective safe end weld; 1 injured.

Two accidents; 2 injured.

# NORFOLK & WESTERN RAILWAY:

October 19, 1931, locomotive 1715, near Max Meadows, Va. Fire tube broke

off at safe end weld; overheated in welding; 1 injured.

February 13, 1932, locomotive 1715, near Narrows, Va. Union ell nut in brake pipe between high and low pressure engines worked loose, allowing brake pipe to become uncoupled, causing emergency application of brakes which resulted in derailment and damage to cars; part of brake pipe clamp was missing rendering clamp inoperative, which permitted brake pipe to vibrate and loosen union nut: 1 injured.

Two accidents: 2 injured.

#### NORFOLK SOUTHERN RAILROAD:

\*\*July 30, 1931, locomotive 542, near Colon, N. C. Back end strap of left main rod broke through grease cup and grease hole of top leg of strap and also through keyway of bottom leg of strap; top of strap showed old crack; "Both back ends knocking bad" was reported on July 21 and "Left back end running hot" was reported on July 23 and 26; 1 injured.

One accident: 1 injured.

#### NORTHERN PACIFIC RAILWAY:

October 16, 1931, locomotive 1702, Duluth, Minn. Tubular water glass burst.

breaking two glass panels in water-glass shield; 1 injured.

March 28, 1932, locomotive 1127, Spokane, Wash. Engineman fell from top of tender while attempting repairs to rear headlight which was inoperative when he reported for service at 10.30 p. m., though this defect had been reported eight hours previous; 1 injured.

Two accidents; 2 injured.

#### OREGON-WASHINGTON RAILROAD & NAVIGATION Co.:

August 29, 1931, locomotive 4913, Portland, Oreg. Fire hose burst; 1 injured. One accident; 1 injured.

#### PENNSYLVANIA RAILROAD:

\*\*July 1, 1931, locomotive 6962, near Marysville, Pa. Brakes applied suddenly

due to defective train control equipment on locomotive; 1 injured.

July 31, 1931, locomotive 5338, near South Elizabeth, N. J. Right front end main rod lateral liner failed and a piece of lateral liner was thrown from the rapidly moving locomotive and struck the fireman on a locomotive on parallel track; 1 injured.

August 8, 1931, locomotive 6892, Stelton, N. J. Rear pin in stoker conveyor flexible drive shaft missing, causing stoker to fail; "Examine stoker, engine very hard to keep working" was reported on August 7; excessive wear in joints of conveyor drive shaft and blocks should have been detected during monthly inspection made on August 7; 1 injured.

August 10, 1931, locomotive 6600, Cleveland, Ohio. Lubricator throttle valve bonnet blew out; threads on bonnet did not properly fit threads in valve body:

bonnet was defective and was distorted and cracked when applied; 1 injured. October 19, 1931, locomotive 840, Bowie, Md. Reverse gear difficult to operate; nut to regulate end play in reverse gear screw and lock nut for same had worked

loose; 1 injured. October 24, 1931, locomotive 6754, Enola, Pa. Defective squirt hose failed;

hose had been burned; 1 injured.

December 8, 1931, locomotive 3763, Kinzer, Pa. Side rod broke due to old

fracture: 1 injured.

16

December 16, 1931, locomotive 6744, Enola, Pa. Broken and galled link block pin fouled movement of link block when attempt was made to reverse locomotive, causing reverse gear wheel to suddenly release and spin around, striking employee; oil hole in link block was stopped up with grease and dirt which prevented link

block pin from getting any lubrication; I injured.

December 18, 1931, locomotive 5483, Terre Haute, Ind. Air compressor lubricator choke plug too small for cage permitting steam to pass into lubricator, making it difficult to fill lubricator and blowing oil out onto the deck; lubricator

reported on December 15 and 16; 1 injured.

January 1, 1932, locomotive 4421, Bolivar, Pa. Back end of main rod came down causing derailment of locomotive, tender and 14 cars; set screws in key block at back end of main rod loosened; resulting in key, bolt, key block, and brasses losing out; threads in bottom set screw hole were defective; defects which may have some bearing on the accident were reported on December 3, 5, 11, 14, 15, 20 (two times), 23, 24, 25, 26, 27, 30 (two times), and 31; 2 injured. February 14, 1932, locomotive 6958, near Norristown, Pa. Crank pin broke

due to old fracture; initial fracture started in tool mark in fillet of pin; fillet was 3/16-inch radius instead of 1/4-inch radius as provided in company's blue print; locomotive riding rough account of tires having flat spots, spring rigging not properly equalized, side rod bushing broken, wedges sticking, and numerous pounds: 1 injured.

\*\*April 14, 1932, locomotive 2885, Lemoyne, Pa. Headlight and cab lights

went out account of generator brush spring slipping off brush; 1 injured.

April 21, 1932, locomotive 3807, Philadelphia, Pa. Engine truck journal broke, due to excessive overheating, causing derailment of locomotive, tender, and first three cars (Pullman) of passenger train; 1 injured.

Thirteen accidents; 14 injured.

# PERE MARQUETTE RAILWAY:

\*October 6, 1931, locomotive 196, Rosymound, Mich. Main crank pin broke inside wheel fit due to old fracture; 1 injured.

One accident: 1 injured.

# PITTSBURGH & WEST VIRGINIA RAILWAY:

\*September 16, 1931, locomotive 911, New Alexandria, Ohio. Main rod strap broke, due to defective material in strap; 1 injured.

Oné accident: 1 injured.

# READING Co.:

\*\*July 23, 1931, locomotive 130, Ocean City, N. J. Handhold on No. 2 air compressor broke off near front and rear connections to compressor head, due to old fractures; 1 injured.

\*January 28, 1932, locomotive 920, Wayne Junction, Pa. Packing in steam

end of air compressor leaking; 1 injured.

June 30, 1932, locomotive 112, Westfield, N. J. Flange oiler reservoir filling cap was thrown from rapidly moving locomotive; 1 injured.

Three accidents; 3 injured.

# RICHMOND, FREDERICKSBURG & POTOMAC RAILROAD:

January 27, 1932, locomotive 325, near Guinea, Va. Main crank pin broke off inside of driving wheel pin fit, due to old fracture which extended over approximately 70 per cent of diameter of crank pin, resulting in locomotive being stripped on left side and broken side rod puncturing outer and inside throat sheets; 1 injured.

One accident; 1 injured.

St. Louis-San Francisco Railway:

September 2, 1931, locomotive 1263, Afton, Okla. Stop pin in quadrant missing, allowing reverse lever handle to strike pipe on boiler head; employee's finger caught between reverse lever handle and pipe; 1 injured.

November 8, 1931, locomotive 4211, Paola, Kans. Whistle valve remained stuck slightly open after each operation; whistle reported on October 22, 25, 28,

29. November 5, 6, 8, 9, and 10: 1 injured.

\*\*February 4, 1932, locomotive 959, Springfield, Mo. Finger injured by heater rod spring while attempting to operate injector; heater rod spring out of notch of heater rod; 1 injured.

\*\*February 29, 1932, locomotive 1505, Oklahoma City, Okla. Handrail failed

at old defect in the bend adjacent to bolt hole at back end; 1 injured.

June 8, 1932, locomotive 1060, near Vinita, Okla. Valve motion combination lever failed and locomotive was continued in service with loose parts swinging until valve oiling step was loosened and thrown from locomotive, striking track employee; combination lever defective around point of failure, having been overheated and contained two progressive cracks, one of which was in the fracture; 1 injured.

Five accidents; 5 injured.

# SEABOARD AIR LINE RAILWAY:

December 18, 1931, locomotive 828, near Marietta, Fla. Reverse lever latch slipped out of quadrant allowing reverse lever to suddenly go to forward corner. caused by excessive vibration of reach rod together with oily condition of reverse lever latch: guide provided to control vibration of reach rod was ineffective; 1 injured.

One accident; 1 injured.

#### SOUTHERN RAILWAY:

\*\*July 21, 1931, locomotive 1478, Asheville, N. C. Fire door closed unexpectedly due to air valve leaking; 1 injured.

\*\*August 3, 1931, locomotive 1682, Chattanooga, Tenn. Squirt hose valve

leaking; 1 injured.

\*\*October 16, 1931, locomotive 1650, Bristol, Va. Hand wheel pulled off stem of air compressor throttle valve, allowing employee to fall from running board; hand wheel loose on throttle stem and its vibration on stem had worn the

off, due to old fracture comprising 75 per cent of back valve chamber head casting, and fell from locomotive breaking into three pieces, one of which re-

bounded and struck track employee; 1 injured.
October 31, 1931, locomotive 8372, Valdosta, Ga. Fire hose burst; 1 injured.
December 1, 1931, locomotive 4828, Manassas, Va. Employee fell from top of tender while taking water; footboard on top of tender cistern defective: 1 injured.

\*\*June 28, 1932, locomotive 4621, Spencer, N. C. Squirt hose valve leaking at

packing nut due to not being properly packed; 1 injured.

# Seven accidents; 7 injured.

# SOUTHERN PACIFIC—LINES WEST:

July 24, 1931, locomotive (C. P.) 5038, near Mescal, Ariz. Nipple in pressure line to feed water pump gauge in cab broke through threads; pressure line not of double strength pipe with extra heavy fittings, as required by rule 116 (c); lost motion in blow-off cock lever, together with offset in lever, permitted lever to strike on pressure line when blow-off cock was operated; nipple which caused

accident was applied just previous to this trip, replacing a broken nipple; 1 injured.

\*\*August 5, 1931, locomotive (E. P. & S. W.) 3308, Esmond, Ariz. Valve
gear reach rod on left side fouled union nut on 1½-inch discharge pipe leading from air compressor to main air reservoir, causing it to break and lose off, permitting the joint to separate so the air pressure was lost from the main reservoirs. The locomotive was equipped with E. T. brake equipment and air reverse gear; loss of the main reservoir air pressure caused loss of control of the locomotive while it was moving backward on a heavy descending grade which resulted in a collision with its train; 3 injured.

October 2, 1931, locomotive (C. P.) 3634, near Ogden, Utah. Crown sheet failure caused by overheating due to water foaming and defective stays in the pocketed area; door sheet was also overheated; locomotive left Sparks, Nev., on September 29 for trip to Ogden, Utah, and while en route, "Change water in boiler," was reported at Carlin, Nev., on October 1 and "Eng. very dirty" was reported at Montello, Nev., on October 2, but water was not changed or boiler washed after leaving Sparks; 1 injured.

December 25, 1931, locomotive 4402, near Richvale, Calif. Crown sheet

failure caused by overheating due to low water; 2 killed.

Four accidents; 2 killed, 5 injured.

# TERMINAL RAILROAD ASSOCIATION OF St. Louis:

August 24, 1931, locomotive 118, St. Louis, Mo. Water glass burst; injured while closing water glass cocks; 1 injured.

October 22, 1931, locomotive 172, East St. Louis, Ill. Pin worked out of driv-

ing brake rigging; 1 injured.

April 1, 1932, locomotive 304, East St. Louis, Ill. Water glass burst, breaking glass panel in water-glass shield; 1 injured.

Three accidents: 3 injured.

#### WABASH RAILWAY:

January 5, 1932, locomotive 612, Jacksonville, Ill. Tender cistern manhole cover fell on employee's foot; back stop for manhole cover was bent down allowing insufficient clearance between the handle on cover and top of tank; 1 injured. January 10, 1932, locomotive 2418, near Truesdale, Mo. Crown sheet failure

caused by overheating due to low water; 1 killed, 2 injured.

\*\*April 10, 1932, locomotive 1528, Detroit, Mich. While alighting from right front footboard, employee's glove caught on rough bronze weld securing pilot beam handrail at flagstaff, causing him to lose his balance and fall to the ground; 1 injured.

Three accidents: 1 killed, 4 injured.

# WESTERN MARYLAND RAILWAY:

May 31, 1932, locomotive 917, Thurmont, Md. Grate shaker bar slipped off post (left side); bar too large for proper fit on post and was so bent as to strike cover plate when it was down on deck, causing bar to slip off post when attempt was made to shake grates. Right grates could not be shaken properly due to bar striking cover plate which did not fold down as intended; 1 injured.

One accident; 1 injured.

# WESTERN PACIFIC RAILROAD:

\*October 1, 1931, locomotive 12, Clive, Utah. Spring hanger broke; 1

injured.

March 15, 1932, locomotive 330, Portola, Calif. Employee fell from roof of first car in train due to his vision being impaired by steam from defective booster the ottle valve and steam pipe; booster could not be cut out by means of air-operated booster valve due to valve travel regulating nut on throttle stem being improperly adjusted causing valve to cock on valve seat and this permitted steam to enter the steam pipe where it escaped through defective packing in bottom ball joint of pipe; 1 injured.

Two accidents; 2 injured.

# ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1932, BY ROADS

[A double star (\*\*) indicates accident not properly reported, as required by rule 335. A complete investigation, therefore, could not be made, inasmuch as the bureau was not apprised of the accident in sufficient time after it occurred to permit it to be promptly investigated.]

#### PENNSYLVANIA RAILROAD:

\*\*July 29, 1931, locomotive unit 3930, Shawmont, Pa. Injured while attempting to raise pantagraph; pantagraph sprung and would not raise when operating button was pushed; 1 injured.

February 9, 1932, locomotive unit 7809, Kearny, N. J. Third-rail contact shoe broke and a piece of shoe was thrown from rapidly moving locomotive, striking track employee; old fractures entirely through outside and inside of ribs of contact portion of shoe: 1 injured.

Two accidents; 2 injured.

# Table XII .- Number of steam locomotives inspected,

	Akron, Canton & Youngstown	Alabama, Tennessee	Aliquippa & Southern	Alton	Ann Arbor	Atchison, Topeka & Santa Fe	Atlanta & St. Andrews Bay	Atlanta & West Point
Air compressors	2					12		
Arch tubes Ash pans and mechanism Axles								
Ash pans and mechanism								
Blow-off cocks						6		
Boiler checks.		1				3 5		
Boiler shellBrake equipment						48		
Cabs, cab windows, and curtains						4		
Cab aprons and decks						6		
Cab cardsCoupling and uncoupling devices								
Crossheads, guides, pistons, and piston rods		1				11		
Crown bolts Cylinders, saddles, and steam chests						12		
Cylinder cocks and rigging						9		
Domes and dome caps	3-					3		
Draw gear						3		
Driving boxes, shoes, wedges, pedestals, and braces	3	2				11		
Fire-box sheets						1 2		
FluesFrames, tailpieces, and braces, locomotive	1					18		
Frames, tender		3				2		
Gauges and gauge fittings, airGauges and gauge fittings, steam		<u>i</u> -				14 6		
Gauge cocks						18		
Grate shakers and fire doors				<b>-</b>		6 15		
Handholds Injectors, inoperative						19		
Injectors and connections		2				42		
Inspections and test not made as required	5 1	1				88 10		<b></b>
Lateral motion								
Lights, neadinghts						2 5		
Lubricators and shields	- <b>-</b>					6		
Packing nuts	ī	4				12		
Packing, piston rod and valve stem Pilot and pilot beams						6 2		
Plugs and studs		<u>ī</u> -				7		
Reversing gear						1		
Rods, main and side, crank pins, and collars	<b>-</b>	1				21		<b></b>
Safety valvesSanders						12		
Springs and spring rigging	7	1				45		
Squirt hose						6		i
Stay bolts, broken								
Steam pipes						35 1		
Steam valves						13		
Tanks and tank valves						14		
Telltale holes						23		
Throttle and throttle rigging						8		
Trucks, tender	1					9		
Valve motion						26 23		
Washout plugs Train-control equipment				<b>-</b>				
Water glasses, fittings, and shields		1				8 16		
Wheels	1	1				11		
Number of defects	26	20				668		1
Locomotives reported	23	16	20	291	57	1,904	10	53
Locomotives inspected	45	30	49	547	145	3, 261 231	12	93
Locomotives defective	16	30				. 7		i
Locomotives ordered out of service	1	3				. 4		-
<u> </u>	1		1	1	1			

ıam	_	9	Ohio	Ohio	- k	?hi-	Erie	неги			-ent		ت چ	Is-		Tel.	
Atlanta, Birmingham & Coast	Atlantic & Yadkin	Atlantic Coast Line		k O	Bangor & Aroostook	Belt Railway of Chi- cago	Bessemer & Lake Erie	Birmingham Southern	Boston & Albany	Boston & Maine	Susque-	ķ	Buffalo, Rochester & Pittsburgh	Burlington-Rock land	rie	Canadian National	
Bir.	& Y	Cog	Baltimore & Lines East	Baltimore & Lines West	& Ar	ilwa	r&]	ham	& Al	k M	k S hanna	Buffalo Creek	Roctisbu	lanc	Camas Prairie	Z Z	
nta,	ntic	ntic	Lin	Lir	gor	Ra	seme	ning	ton	ton	Buffalo	falo	falo,	ling	nas	adis	
Atla	Atla	Atla	Balt	Balt	Вап	Belt	Bess	Birr	Bosi	Bos	Buf	Buf	Buf	Bur	Car	Car	
2	1	12	8	7					1	3 2 1			3 4			1	1
		11		1						1							3
<u>î</u>		1 4	3-	1 1					1	<u>î</u>			<u>-</u> 4			2	6
2			3 1 13 12 3 1	1 1 2 7 11 3 3		2 1 2 1	6 1		4 9 9	<u>13</u>	4		20 8 1	<u>2</u> 1	3 4	14	8
2 1 1	1	20 7 2	12 3	11 3	4	2 1	1			13 9 1 1	8		8	1	4	14 10 2	10
			$\begin{bmatrix} 1\\1\\1 \end{bmatrix}$						3	<u>1</u>			10				12
		29 6	1	12 15					9 <b>2</b>	14			21	2			14
			1 14 1 18 5 5			2			<u>1</u>	1				4			I(
		2 3 3 5 4 1 14		2 3 8 11		1					1		6	1	<u>i</u>	1 2 3	1 2 2 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
		5	5 34 1	. 11			3		1 2	6 8 2			74 2		1 2	3	20
		1 14		13	1	4			3	7			8	<b>-</b>	<u>î</u> -	2 1	2:
	1		21 1 2 6	1					<u>-</u> -						<u>-</u>		2
		3 6 1 5	6	3 2						9			4 5 4	1	2	2	2
		1 5	3	2	<sub>1</sub> -	1				9 4 2			3	1		1 2	2
<u>î</u> -	2 1	19 74	3 2 10 74 3 1	12	3	2	<u>ī</u>		6	13			16 43 5	4	2 1	19	3
	1	74	74	12 58 3	3	1	4		6 45 2	13 77 1	4		5	4 2 2		19	3
		1		1		1			1				2		1		3
		6	2 2 1 6	2 1 7	2	1			1 1 6 1	1 2							3
		1 2	6	7		1 2 2 2			<u>î</u> -				1	1			3
		1 1 6 5 1 3 4 5	4 3	9			1		1 2	7 7 15			1 1 13 2 62				4
		2	3 25 1 3 77	9 12 3 2 51		1			2	15			62	2 1		2	4
2		44	3 77	2 51			5		6	16	·î		25	<sub>1</sub>	3	14	4
		44 3 1	Į.	2					3		1					<u>-</u> -	4
	ĩ		32		17				1	6			5		5		5
3		1 3 6 20	2 32 2 1 1 3 2 5 15 14 6 10	5 1 2 10		. 1			1 5	3	1 1		5 1 27 7	1 2	1 2	1	5
1		1	3 2							3 5 3 2 10 5 6 3	<u>i</u>		.	2	2	2 1 2 1 12	5
		10 8 6 21 23	15	6 7 1					2	10	4		6 21 4 18 27		1	1 12	5
		21	6	13 5					9 1 2	6 3		-	18 27	3			
	-	6	6	1		5	3							-		i	i e
1		6 4	15 1	14		1 2	1		3 2	3 2		-	12 9	1		3	è
15	7	422	488	335	29	37	26	-	149	294	32		502	32	32	106	-
80	17	978	2, 474		82	101	129	23	296	770	36	20	172	26	16	213	=
161 7 4.3	27 1 3. 7 1	1, 459 184 13 9	2,326 124 5 4	2, 015 105 5 6	103 4 3.9	98 18 18 2	186 4 2. 2		462 62 13 3	110	5	12	. 63	8 22	25 10 40 == 1	123 28 23 1	

Table XII.—Number of steam locomotives inspected,

	Parts defective, inoperative or missing, or in violation of the rules	Canadian Pacific	Carnegie Steel	Carolina & North- western	Central of Georgia	Central R. R. of New Jersey	Central Vermont	Charleston & Western Carolina	Chesapeake & Ohio
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 12 22 24 25 6 27 28 29 30 13 23 33 34 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 12 22 24 25 6 27 28 29 30 13 23 33 34 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 12 22 24 25 6 27 28 29 30 13 23 33 34 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 12 22 24 25 6 27 28 29 30 13 23 33 34 5 6 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 12 22 24 25 6 27 28 29 30 13 23 33 34 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 12 22 24 25 6 27 28 29 30 13 23 33 34 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 12 22 24 25 6 27 28 29 30 13 23 33 34 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 12 22 24 25 6 27 28 29 30 13 23 33 34 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 12 22 24 25 6 27 28 29 30 13 23 33 34 5 6 7 8 9 10 10 10 10 10 10 10 10 10 10 10 10 10	Air compressors. Arch tubes. Ash pans and mechanism. Axles. Blow-off cocks. Boiler checks. Boiler shell. Brake equipment. Cabs, cab windows, and curtains. Cab aprons and decks. Cab cards. Coupling and uncoupling devices Crossheads, guides, pistons, and piston rods Crown boits. Cylinders, saddles, and steam chests. Cylinder cocks and rigging. Domes and dome caps. Draft gear. Driving boxes, shoes, wedges, pedestals, and braces. Fire-box sheets. Filues. Frames, tailpieces, and braces, locomotive. Frames, tender. Gauges and gauge fittings, air. Gauges and gauge fittings, air. Gauges and gauge fittings, steam. Gauge cocks. Grate shakers and fire doors. Handholds. Injectors and connections. Inspections and tests not made as required. Lateral motion. Lights, cab and classification. Lights, headlights. Lubricators and shields. Mud rings. Packing, piston rod and valve stem. Pilot and pilot beams. Plugs and studs. Reversing gear. Rods, main and side, crank pins, and collars. Safety valves. Sanders. Springs and spring rigging. Scuirt hose. Stay boits. Stay boits. Stay boits. Stay boits. Stay boits. Stay boits. Tranks and tank valves. Tranks and tank valves. Tranks and tank valves. Train-control equipment. Water glasses, fittings, and shields. Wheels. Miscellaneous—Signal appliances, badge plates, brakes (hand).	1 2 9 9 2 2 3 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			3 12 1 1 1 1 1 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	3 9 920 166 61 15 5 22 148 89 22 246 161 111 111 29 44 30 30 31 55 66 13 111 115 115 115 115 115 115	1 4 4	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6 1 4 4 6 6 7 7 7 3 4 4 3 1 1 2 2 3 8 6 6 6 2 9 4 4 2 2 8 8 1 1 2 2 2 9 2 2 3 2 2 7 5 1 6 3 2 2 5 1 0 2 2 4 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
	Number of defects  Locomotives reported  Locomotives inspected  Locomotives defective  Percentage of inspected found defective  Locomotives ordered out of service	107 156 96 28 29 4	37 48	3 10 24 2 8	311 406 47 12 1	307 511 672 88 13	15 67 124 5 4	13 55 72 6 8 1	347 1, 057 1, 853 132 7

Chicago & Eastern Illinois	Chicago & Illinois Midland	Chicago & Northwest- ern	Chicago & Western Indiana	Chicago, Burlington & Qunicy	Chicago Great West-	Chicago, Indianapolis & Louisville	Chicago, Milwaukee, St. Paul & Pacific	Chicago River & Indiana	Chicago, Rock Island	Chicago, St. Paul, Minneapolis & Omaha	Chicago Short Line	Chicago, West Pull- man & Southern	Cleveland, Cincinnati, Chicago & St. Louis	Clinchfield	Colorado & Southern	Colorado & Wyoming	
3		3 4 3 49 12 2 2 3 13	1 1 1 4 4 1	2 1 16 9 3 3 3 6	13 1 2 1 5 4 6 52 33 8 2 39 26 24 1 9 9 49 4	1 2 2 1	3 2 1 1 3 31 28 9 1 3 16	1 3 2	20 6 	2 1 2 1 3 1 42 11 1 	1 1 2 3 3 2 1 1 2 1		2 3 1 2 3 3 1 2 1 2 1 2 1	1 -1 -1 -2 3 1 7	2		1 2 2 3 4 5 6 7 7 8 9 9 10 1 1 2 2 1 1 1 4 1 1 5 6 6 7 7 8 9 9 10 1 1 2 2 1 1 1 4 1 1 5 6 1 7 7 8 1 1 9 9 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2
4 5 1 1 1 7		14 5 1 2 4 6 2 7	1 1 2 1	1 3 14 1 8 4 1 2 3 2 14 31	8 3 2 4 3 5 10 1 37 141 21 21 13 2 4 11 11	1 2 	24 4 7 3 3 3 7 6 57 2		7 11 9 15 7 3 56 170 18	5 1 5 	1		3 1 8 3 1 1 1 2 1 4 34	10 1 	3	1	19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
3 2 1 2 2 3 3 2 2		1 2 5 1 3 15 4 4 29 9 37	1 1 3 1	1 6 5 1 3 10 5 12	9 14 14 39 1 16 125	1 1 5 5	4 1 2 1 5 1 1 4 4 5 48 1 1 3	8	2 8 10 14 15 6 4 12 58 23 93 916 8	1 4 1 10 	1 1 1 2		2 1 1 17 5	2 1 1 11	1 2 6		35 36 37 38 39 40 41 42 43 44 45 46 47 48
1 5  1 1 1		22 4 14 3 6 7 3 18 3 6	1 1	1 2 6 5 1 9 2 5 6 8	1 4 5 6 5 20 1 11 13 8 12 16	6 1 5 1 2 2 2 3	1 1 3 2 1 9 4 11 14 6 3		8 2 23 9 18 50 4 37 29 9 37 32 22 30 16	6 2 2 2 16 5 4 3	2		2 1 6 1 3 2 7 1 5	3 5 2 5 6 2	5 3 4		50 51 52 53 54 55 56 57 58 59 60 61 62 63
53		495	24	237	932	64	440	14	1, 272	246	30		136	108	42	1	
292 403 20 5	29 34	1, 682 3, 162 155 4. 9	26 37 3 8	1, 318 2, 882 100 3. 5 3	227 726 207 29 27	173 262 16 6	1, 707 2, 661 122 4. 6 1	66 49 4 8	1, 492 3, 104 373 12 31	318 724 68 9 1	11 22 7 32	12 15	780 1,074 44 4 1	86 81 16 20 1	129 293 13 4, 4	26 18 1 6 1	

Table XII.—Number of steam locomotives inspected,

Parts defective, inoperative or missing, or in violation of the rules	Columbus & Green-	Conemaugh & Black Lick	Copper Range	Cumberland & Penn- sylvania	Davenport, Rock Island & Northwestern	Delaware & Hudson	Delaware, Lackawan- na & Western	Denver & Rio Grande Western
Air compressors	<b></b> -		1				3	
Arch tubes Ash pans and mechanism			2					
Axles							1	
Blow-off cocks								
Boiler checks	0	1				;-	1	
Brake equipment						1	15 12	1 4
Brake equipment Cabs, cab windows, and curtains							23	$\hat{6}$
Cab aprons and decksCab cards						1	1	
Coupling and uncoupling devices	<b>-</b>					2	1	
Coupling and uncoupling devices Crossheads, guides, pistons, and piston rods						1	6	6
				$\frac{1}{1}$				
Crown folias.  Cylinders, saddles, and steam chests  Cylinder cocks and rigging  Domes and dome caps  Draft gear.							21 5	13
Domes and dome caps						1	3	l
Draw gear Driving boxes, shoes, wedges, pedestals, and braces Fire-box sheets.				2	1	<u>i</u> -	4	$\frac{2}{2}$
Driving boxes, shoes, wedges, pedestals, and braces.	2					3	15	6
Fire-box sheetsFlues		1		2			6	
Frames tailnieges and brages locomotive	-						1 10	<u>-</u> -
Frames tender							ı	î
Gauges and gauge fittings, air Gauges and gauge fittings, steam				1			3	1
Gauge cocks				1			2 3	<u>i</u> -
Grate shakers and fire doors								4
Injectors inonerative			2	1			5	<sub>1</sub> -
Injectors and connections Inspections and tests not made as required	1			1		1	26	4
Inspections and tests not made as required			3			7	59	9
Lights, cab and classification			:				6	1
Lateral motion Lights, cab and classification Lights, headlights							5	
Mud rings								1
Packing nuts. Packing, piston rod and valve stem Pilot and pilot beams.						1	7 2	1
Packing, piston rod and valve stem				1			9	8
Plugs and studs							$\frac{2}{1}$	
Plugs and studs Reversing gear Rods, main and side, crank pins, and collars Safety valves							l	<sub>1</sub>
Rods, main and side, crank pins, and collars						1	15	7
							2	
Springs and spring rigging							27	2
Stay bolts. Stay bolts, broken				2			2	
Steam pipes Steam valves							6	
Stens							4	
Tanks and tank valves	<u>i</u> -		2				9 7	3
Telitale noies			1					
Throttle and throttle rigging Trucks, engine and trailing	1				i		9 5	1
Trucks, tender							5 4	1 11
Valve motion						1	8	5
Train-control equipment					- <b>-</b>		10	1
Water glasses, fittings, and shields			1	1			3	2
Miscellaneous—Signal appliances, badge plates, brakes (hand).	1					1	3 2	1 2
Number of defects	10	2	12	14	1	23	377	124
Locomotives reported	30	30	20	14	10	435	602	476
Locomotives inspected Locomotives defective	35	7	30	21	29	581	1,067	779
TOOOTHOU TOO METORITY C	5	.1	4	4	1	9	108	40
Percentage of inspected found defective Locomotives ordered out of service	14	14	13	19	3.4	1.5	10	5

Denver & Salt Lake	Detroit & Mackinac	Detroit & Toledo Shore Line	Detroit Terminal	Detroit, Toledo & Ironton	Donora Southern	Duluth & Northeast- ern	Duluth, Missabe & Northern	Duluth, South Shore & Atlantic	East Broad Top Rail- road & Coal	East St. Louis Junction	East Tennessee & Western North Carolina	Elgin, Joliet & East- ern	Erie	Florida East Coast	Fort Smith & West- ern	Fort Worth & Denver City
						2	<b>-</b> -	1	<b>-</b>				12	<b>-</b>		1
													6			
					1						ī	î	4			
													$\begin{array}{c} 4 \\ 7 \\ 24 \\ 10 \\ 3 \\ 1 \\ 1 \end{array}$		<u>-</u> -	<u>1</u>
	2				4 2 3	1	1	5 1			1		10			
					3	<b>-</b>		<b>-</b>					1			
				;-				1					10			
		1	1	1	4				 		4		10			
			<b>-</b>		4						4		1 8 1 1			1
													į			
			1		3	- <b></b>		1 3			2		1 4			
			1					3					4 11 6 5 17			
			1						<sub>1</sub> -		1		5			1 2
											6		17			2
											1					
	1							;-				1	10			3
			<b>-</b> -		4			1					1			
	1		2		1	3					3		1 10 1 2 2 30 27 9		<b>-</b>	
. <b></b> .	3	2	1 5	1 2	2 4	1							30			4
	3	4	5	2	4		1	8		1	7	1	27		4	7
													5			
			1													
	5 2		1		i								5			2
					1 3 1 2 26			<b>-</b>	<b>-</b>				10			
. <b></b>		1	1		2				1				3			
		<b>-</b>			26			2	3	1	3		23			3
<b>-</b>	5	1	2 2							:-			8 5 3 10 3 23 1 3 29		;-	
- <b>-</b>		- <b></b>	2		1	2	1		1	1	4				1	4
													2		1	
					3			6	2			2	4			
			1					1 3					2 3 4 5 5 6			
			1	1	2						1		6			
								1	2		2		4			
- <b>-</b>				1				1			1 3		23 12 11 5			
		.			4			. 2			3		12			2
	i												5		3	2 2
	·  <b>-</b>							2			1		4		1	1
<b>-</b>		i			8			- <b></b>					16 6		$\frac{1}{2}$	$\frac{1}{2}$
	<del></del>				<b>-</b>			·	-				6			
	22	11	22	7	86	11	4	44	12	3	50	6	412		17	36
= 58	22	30	34	75	14	12	186	64	11	11	12	271	1, 077	175 102	26	120
73	24	61 4 7	24	156 2	26 12	5 3	62	88 8	35 3 9	6	24 10 42 5	272 2 .7	1, 077 2, 279 86 3. 8 7	102	32 5	209 8 3.8
	. 6	1 4	5 21	1.3	46	60	1.6	, 0	, 3	17	10		1 00	1	16	1

Table XII.—Number of steam locomotives inspected,

			_						
	Parts defective, inoperative or missing, or in violation of the rules	Galveston, Houston & Henderson	Georgia & Florida	Georgia	Grand Trunk Western	Great Northern	Green Bay & Western	Gulf Coast Lines	Gulf, Colorado & Santa Fe
,	Air compressors				1	1			2
1 2	Arch tubes		6		1	1			
3	Ash pans and mechanism		1		1				
4	Axles		1						
5 6	Blow-off cocks Boiler checks				6	1 5			1
7	Boiler shell				2	6			
8	Brake equipment		6		4	37	2	1	18
9	Cabs, cab windows, and curtains		<b>-</b>		11	17	2		
0	Cab aprons and decks		2	<b>-</b>		4	1		1 2
2	Cab cardsCoupling and uncoupling devices		1			1			
3	Crossheads, guides, pistons, and piston rods		13		2	9			5
4	Crown bolts								
5	Cylinders, saddles, and steam chests		10		7	11			2
6	Cylinder cocks and rigging Domes and dome caps				9	4			1
8	Draft gear				4	3			2
9	Draw gear	. <b>.</b>	2		4	7		1	2
20	Driving hoxes, shoes, wedges, pedestals, and braces		2			20			14
21	Fire-box sheets					1			
23	Frames, tailpieces, and braces, locomotive		13		<u>i</u> -	5			6
24	Frames, tender					ĭ			
25	Gauges and gauge fittings, air					1			4
26	Gauges and gauge fittings, steam				3	3			1 2
27 28	Grate shakers and fire doors				2	1	3		]
29	Handholds		3		2	7			6
30	Injectors, inoperative								
31	Injectors and connections		4		6 23	9			14 16
32 33	Lateral motion.		14		23	39 4		5	7
34	Lights, cab and classification					$\hat{2}$			
35	Lights, headlights					3			1
36 37	Lubricators and shields				1				
88	Packing nuts				5	5 2			1
39	Packing, piston rod and valve stem		2		1	2	3		
10	Pilot and pilot beams		7		1	2			4
11	Plugs and studs					$\frac{2}{2}$			4
13	Rods, main and side, crank pins, and collars		9		4	8			8
14	Safety valves				8				
15	Sanders				11	4	2		10
16 17	Springs and spring rigging Squirt hose		3		5 2	36	4		15
18	Stay holts	1	1						
19	Stay bolts, broken Steam pipes Steam valves					4			1
50	Steam pipes					1			1
$\begin{bmatrix} 51 \\ 52 \end{bmatrix}$	Steps		6		2 2	1			10
53	Tanks and tank valves		4		3	2			1
54	Telltale holes				1 -	2			
55	Throttle and throttle rigging	<b> </b>	1		3	4	2	2	1
56   57	Trucks, engine and trailing Trucks, tender		3		3	6 11	1		12 6
58	Valve motion		2			7			1
59	Washout plugs		4	- <b></b>	2	12			1
60 31	Train-control equipment. Water glasses, fittings, and shields.								4
52	W Deels		12		8 2	11 7		1	3
33	Miscellaneous—Sigual appliances, badge plates, brakes (hand).				5	5		î	
ļ									
	Number of defects		130		157	342	20	11	191
ļ	Locomotives inspected	12	32	67	327	1, 134	47	91	(1) 445
	Locomotives defective	4	65 34	97	379 29	1, 928 94	101	264	445 39
J	Locomotives defective.  Percentage of inspected found defective		52		8	4.9	8	2.3	9
١	Locomotives ordered out of service		3			4	8 2	ĩ	3
		1		1	ı	1	1	1	1

<sup>&</sup>lt;sup>1</sup> Atchison, Topeka & Santa Fe.

found defective, and ordered from service, etc.—Continued

Gulf, Mobile & North- ern	High Point, Thomas- ville & Denton	Houston Belt & Ter- minal	Huntingdon & Broad Top Mt. R. R. & Coal	Illinois Central	Illinois Terminal	Indiana Harbor Belt	Indianapolis Union	International - Great Northern	Interstate	Jacksonville Terminal	Kansas City Southern	Kansas City Terminal	Kansas, Oklahoma & Gulf	Kentucky & Indiana Terminal	Lake Erie & Eastern	Lake Superior & Ish- peming	
Gulf	High	Hou	H	Illip	Illing	Indig	India	Inter	Inter	Jack	Kans	Kans	Kan	Kent	Lake	Lake	
1				9					9								
3																	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1				6													
1				6 7 1 52 27 19					. 1								
5				52	2			2	39		i						
5 3 2 1	1			27		1		2	39 6 1		-	-	-	·	.	4	
ī				4									1				i
9			<sub>i</sub> -	4 1 23 3 46 44				1	7		-		·				1
l	.		<u>-</u> -	3		1			.l. <b>-</b>								ļί
3				46				2	7 6 1		-		-				1
									ĭ								i
	1			19					11 4							1	1
				31	1				ì				ī				2
1 2 3				6	<sub>i</sub> -												2
3				37				1	8 4								2
				4				j	1		·						2
				4				1	1				2				2
				25 15				1 3	4		. 1						2
				13		1			1 8					1			2
				40					6								3
7 3				246	5	1		3	22		$\frac{1}{2}$		1 2			1 3	3
				8							2						3
				9							1						3
5 4 2				4							1						30
2				24					2 2					i			3
				47													3
				1				1	1								4
4				7	;-			3	1 1 18		1						4
				3					16					2			44
				16					1								4
1				4				2	20				1				40
18 1				19 200 201 6 1 37 4 9 4 9 24 4 47 5 1 7 88 8 13 3 4 4 17 38 1 15 226 226 218				1									4
1 1				3													49
J				4					1								5
5				38				2	1 10 8 3 1		<sub>1</sub> -					3	52
				1					3								54
2				42		<b></b>		1	12		1						δι 54
5 2 1 3 4				26					12 51 12 2								57
4				25 18				1	12		1						58 50
																	60
1				37   24		1			2		<u>î</u>						61
				16				1									62 63
102	3		2	1,350	16	5		30	297		15		8	4		12	
66	11 13 2	10	15	1, 763 3, 261 351	27	127	20	207	12	13	149	36	23	33	14	36	
167 33	2	51	33	351	34 5	127	19	364 4	41 28	28	329 7	41	38 2	11	42	16	
33 20 8	15		3	11	15	.8		1.1	68		2. 1		5	_ ^ I		19	
. 01				26	,		- 1	1	41	- 1	- 1	- 1		- 1			

	Parts defective, inoperative or missing, or in violation of the rules	Lake Superior Ter- minal & Transfer	Lake Terminal	Lehigh & Hudson River	Lehigh & New Eng- land	Lehigh Valley	Litchfield & Madison	Long Island	Los Angeles & Salt Lake
1	Air compressors					5 4			1
2 3	Arch tubesAsh pans and mechanism					1			
4	Axles			<b>-</b>					1
5 6	Blow-off cocks Boller checks		<b>-</b>			1			1
7	Boiler shell		l	1		11			
В	Brake equipment	3	<b>-</b>	1	1	33	4		7 3
10	Cab aprons and decks			1	1	16 4			1
11	Cab cards					î			1
12	Coupling and uncoupling devices Crossheads, guides, pistons, and piston rods Crown bolts				<sub>1</sub> -	13			1 11
13 14	Crown bolts		~	i		1			
15	Cylinders, saddles, and steam chests				1	24	<b>-</b>		
16 17	Cylinder cocks and rigging Domes and dome caps			<b>-</b>		15			
18	Draft gear					4			2
19	Draw gear				3	14	1		2
20 21	Driving boxes, shoes, wedges, pedestals, and braces Fire-box sheets			1 3		4			
22	Flues		<b>-</b>			5			
23 24	Frames, tailpieces, and braces, locomotives					<u>-</u> -			
25	Frames, tender Gauges and gauge fittings, air Gauges and gauge fittings, steam Gauge cocks					6			
25 26 27	Gauges and gauge fittings, steam					2		:	2
27 28	Grate shakers and fire doors			3-		4 7			1 1
29	Handholds. Injectors, inoperative	1				4			
30	Injectors, inoperative				3	18			8
31 32	Injectors and connections	<sub>1</sub> -		5	3	61	3		20
33	Inspections and tests not made as requiredLateral motion				1	3			
34 35	Lights, eab and classification Lights, headlights	<b>-</b>		<b>-</b>		1 6			2 3
36	Lubricators and shields					2			
37	Mud rings			1	2	3			
38 39	Packing nuts Packing, piston rod and valve stem				ī	7			
40	Pilot and pilot beams					2			<b>-</b> ;-
41 42	Plugs and studsReversing gear				- <b></b>	1 2			1
43	Rods, main and side, crank pins, and collars		. 2		3	26			1
44	Dately Varves					3 2			2
45 46	Sanders Springs and spring rigging		i-	2	1	46			5
47	Squirt hose		. 1						
48	Stay bolts	<b>-</b>				1 15			1
49 50	Stay bolts, broken	1				8			
51	Steam valves				1	6			1
52 53	StepsTanks and tank valves					4	1	<b></b> -	1 5
54	Telltale holes					4			
55	Throttle and throttle rigging.		<b>.</b>		1	4 26		<b>-</b>	
56 57	Trucks, engine and trailing				1	2			
58	Valve motion					7			2
59 60	Washout plugs Train-control equipment					5			
61	Water glasses, fittings, and shields	. 1		4	1	13			
62 63	Wheels	1		. 1		5 2			1
	Number of defects	. 8	4	25	25	471	9		89
	Locomotives reported	12	17	29	62	685	10	95	187
	Locomotives inspected	. 9	16	60	202	1,274	9	199	249
	Locomotives defective Percentage of inspected found defective	22	1 6	12	11 5	108	33		32
	Locomotives ordered out of service		-			4			i

Louisians & Arkansas	Louisiana & North- west	Louisiana, Arkansas & Texas	Louisville & Nashville	McCloud River	McKeesport Connecting	Macon, Dublin & Sa- vannah	Maine Central	Maryland & Pennsylvania	Michigan Central	Midland Valley	Minneapolis & St. Louis	Minneapolis, North- field & Southern	Minneapolis, St. Paul & S. S. Marie	Minnesota & Interna- tional	Minnesota, Dakota & Western	Minnesota Transfer
	1		6			1			. 5			2	1			1
													2			
			2				<u>î</u> -		4	2	<u>ī</u> -					
			2 4 3 37 15 2			1	1		4 2							;-
	1	4	37			5	1	5	8		7	1 4	17			1 11
<u>-</u> -		1	15 2			5 3 1	1 4 1		8 11 1		7 7 1	4	9			
	1		1				2						ī			1
	1		11			1	<u>-</u>	2	i			1				
	2	1	18			1	12	2	12		2					
			18 3				12 5		12 12				2			1
			7			5					<u>î</u> -		2	<u>î</u> -		ī
2	1		7 16 7 1	2	<b>-</b>	5 1 5	1 4	1	6		1 1		$\begin{array}{c c} 2\\1\\2\\1\\1\\1\end{array}$			
i		1 2 1	i					;-	1							
			23			2	1	1	1 2			<u>ī</u> -	1			
<u>-</u> -						2 1 1					1					<del>-</del> -
	2 1 1		2 5 9						5			1 2 1	2			
			4				4	1	5 2 2 8		2	1	2 2 2 1 3			
;-	1	2					2	1	8		2 4	<b></b>	3			1
1 3 6	1 7		6 89				3		15 36	1	1 21	1 5	2			7
6	7	8 1	89			16	3 26 3	3	36	<b>-</b>	21	5	38 1	<b></b> -		12
			1								1		2 38 1 6 1			
		ī	3			î						2		ī		
			3 4 6 5 3 2 1 19					1	21		2	2 1 3	<u>-</u> -			1
	1		5				1 1	2	21 3 4		2 1		1 3 1			
<u>ī</u> -			2			<b></b> -										
			10	<b>-</b> -		5 3	<u>2</u> -	- <b></b>	$\begin{vmatrix} 1 \\ 6 \end{vmatrix}$		1 3 4	$\frac{1}{2}$	1 3 4 4 14 2			<u>-</u> -
											4		4			
	<del>-</del> -	3	1 20			;;-	1 8		6 7		<u>ī</u> -	1 9	14			
	4 1		1								1		2			
2 1		1 9 2	9						3					3		
1	2	2	2				<u>-</u> -		2		1	2 2	3			
			1 20 1 2 9 2 1 5				1 1 2		2 6 6 4		1 2		2			3
	3	4				2	2				2		1		<b>-</b>	1
	<u>-</u> -		3 10 8 16 13			1			5 3 5				3 2 2 1 5 1 4 2 3		<b>-</b>	
	4 1		8			1 4 9 7	1 2 5	1 6 2	5		1	2	4	î		22
		1 1	16 13			7	5	2	4			2 2 1	2 3			2
:-																- <b></b>
1		3	10 5 2			3	3 2 1		11 2 3		2 1		5 8 1			1
			2		<b>-</b>	2	1	- <b></b> -	3				1			1
22	36	47	436	2		96	104	31	237	3	73	47	171	6		70
76	13	13	1, 321	13	13	13	221	14	546	26	218	11	430	10	12	20
205 9	22 9	13 37 12	1,896 122 6	4 ]	11	51 21	306 31	14 23 7	600 50	48 1	463 32 7	17 6	913 50 5	12 1	11	20 59 15 25 2
4.4	41	32		25		41	10	27	8	2. 1		35	~~	8		5¥ 1

Table XII.—Number of steam locomotives inspected,

Parts defective, inoperative or missing, or in violation of the rules
Parts defective, inoperative or missing, or in violation of the rules
Air compressors       6       8       3         Arch tubes.       8
Air compressors       6       8       3         Arch tubes.       8
Air compressors       6       8       3         Arch tubes.       8
Air compressors       6       8       3         Arch tubes.       8
Air compressors       6       8       3         Arch tubes.       8
Arch tubes
Ash pans and mechanism  Axles.  Blow-off cocks  Boiler checks.  Boiler shell.  Brake equipment.  Cabs, cab windows, and curtains.  1
Bilow-off cocks
Boiler checks
Brake equipment.
Cab aprons and decks
Cab cards   Cap cards   Cap cards   Cap cards   Cap cards   Coupling and uncoupling devices   Crossheads, guides, pistons, and piston rods   Cap cards   Cap car
Crossheads, guides, pistons, and piston rods
Crown bolts   Crown bolts   Cylinders, saddles, and steam chests   1
Cylinder cocks and rigging
Domes and dome caps.
Draw gear
Driving boxes, shoes, wedges, pedestals, and braces.
Flues
Frames, tender
Gauges and gauge fittings, air 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
Gaiges and gaige fiftings, steam
Gauge and gauge fittings, steam 2 1 1
Grate shakers and fire doors
Injectors inonerative
Injectors and connections
Leteral motion
Lights, cab and classification
Lubricators and shields 1 1 1 1
Packing nuts 1 11 8 3
Packing, piston rod and valve stem 3 2 5
Plugs and studs 2   1   1
Reversing gear 2 2 2 Rods, main and side, crank pins, and collars 4 9 4 3 Safety valves 9
Safetý valves
Springs and spring rigging 13 5
Squirt hose
Stay bolts broken
Steam valves   1   3   2
Steps.
Telltale holes 1 1 1
Throttle and throttle rigging
Train-control equipment
Water glasses, fittings, and shields
Miscellaneous—Signal appliances, badge plates, 6 1 2brakes (hand).
Number of defects
Locomotives reported
Locomotives inspected
Percentage of inspected found defective 12 31 4.2 3 2.8 12 9
Locomotives ordered out of service 5 6 1 1 1 -

Montour	Montpelier & Wells River	Nashville, Chattanoo- ga & St. Louis	Nevada Northern	Newburgh & South Shore	New Orleans-Great Northern	New York Central Lines East	New York Central Lines West	New York, Chicago & St. Louis	New York, New Haven ven & Harford	New York, Ontario & Western	Norfolk & Portsmouth Belt Line	Norfolk & Western	Norfolk Southern	Northern Pacific	Northern Pacific Ter- minsl
		4				4 1	14 3 2	4	3 1 4	1		3 1	1	23 1 7	
											<b>-</b>				
		3				17 10 10 12 4 1	1 6 3 5 10 2 1	6 5 3 10 12 3 2	1	4		6	5	1 7 56 26	
						10	3	3	3 4 5 5 1 2 5	4 2 6 3 3		6 1 3 6 1 2		7 56	
		20 4 4 3				12	10	12	5	3		6	2 1	26	
		4 2				4	2	3	5	3		1 2			
							'		2					3	
		1				13	3 1	5		3	1	8		26 1	
		12 2				2	14	6 5	3 2	1		7	1	14	
						1	3					1	1	í	
		1 1 12 2 1 13 1				1 6 3 12 4 1 1	3 1 14 7 3 5 3 6	2 4	3 7 1 5 1 5	2 3 6 5 3 7		7 2 1 3 2 8 2	1 2 1	3 26 1 14 7 1 9 2 16 3	
		12				12	6	Į.	í	6		8	1	16	
		2				4		3	5	5			2 2	- 1	
		13				17	2 9 1	1	5	7		8		12 3 4	
		1					$\frac{1}{2}$					1		3 4	
						1 3 3 4 5	2 4	2		2		1 8 5		6	
		4 2 2				3	3		2 1 2	2 6 4 1			2	4	
		2				5	3 1		2	ī		2	ļ. <b></b>	21 1 26 14 2	
		6				16	9	1 17 61	6	3	1	18	8	26	
		6 48 1				16 65 4 1	9 35 3	61	6 54 3	3 16 12		18 26 1		14	
		1				1			l			1			
							3 5		1	1 1 3 1			- <b></b>	11 2	
		1 2 1 1			1	3 10 8			5 1	3		2	<u>i</u> -		
		1			1 2	8	3 1 2 3 15	6 8 1 1 3 7	1	1		9	2	5 12 13	
		1	- <b></b>			1	1	î		2		3		13	
		1				9	2	1 2	1 2 2	2 2 2 7	- <b>-</b>	5			1
		5				1 9 2 26	15	7	2	7	1	7	1	1 17	
								<del>-</del>				6		16	
		17			1	3 42	3 22 1 4	10 2 2 2	1 7	24 1		1 2 9 8 3 5 2 7 6 4 8 1 3 2	1	. 16 52 2	
			- <b></b>				1 4	2	2	ļ	3	1 3	6	2	
						6 1 10 3 8 7	<b>-</b>		33 2 1 4	1		2		8	
	- <b></b>	1				10 3	6	l .	1 2	1 2 2 3 4	<b>-</b>		1	26 10	
		2 8 1 2 6 7 4 3			1 1 1	8	6 2	2 3 1 8 2 5	4	3	<u>i</u>	1 5 2	3	26	
		8			1			3	4		1		ł		
		2				11	4	8	4	7		į	3 1	3	
		6 7				11 1 9 11 14	4 7 4 5 10	5	10 5 1	7 3 9 3		1 5 7	1	3 8 21 18 10	
		4				11	5	1	Į	3		7 7	2	18	
		3			1	14	10	19	4			/ 			
		1			1	42	10	13 7	4	6		5 4	1	30	;-
		1				17 13	13	3	1 5	4 5		10	1	11 11	1
		217			9	481	295	265	229	187	7	240	51	602	2
22	14	240	17	30	33	1, 689	1, 200	444	808	177	22	770	99	997	13
31	26	471 58	5	9	29	1, 853 139	1, 196 65	887 77	860 91	343 53	63	1, 175 94	226 30	1, 496 174	12 2
		12			21	9	5	9	11	15	10	8	13	12	17
		1	I			. 3	4	5	4	2	I	3	1	1	1

Table XII .- Number of steam locomotives inspected,

Parts defective, inoperative or missing, or in violation of the rules	Northwestern Pacific	Oregon Short Line	Oregon-Washington Rail- road & Navigation	Patapsco & Back Rivers	Pennsylvania	Peoria & Eastern	Peoria & Pekin Union	Pere Marquette
Air compressors		9	4	<b></b> -	25			7
Arch tubesAsh pans and mechanism					7 5			
Axles								
Blow-off cocks					5	1		1
Boiler checks	-		1		16	:-		1
Boiler shell		21	$\begin{vmatrix} 1\\9 \end{vmatrix}$		16 106	1 3	1	4
Brake equipment Cabs, cab windows, and curtains		43	20		36	1	1	9
Cab aprons and decks.		4	3		16			
Cab cards	.	1			2	<b>-</b>		
Coupling and uncoupling devices		4			6			<u>-</u> -
Crossheads, guides, pistons, and piston rods	-	3	7		62 7	1		3
Cylinders, saddles, and steam chests.			17		37	2		3
Cylinder cocks and rigging		7	1		8			
Domes and dome caps	-		1 2		4			;-
Draft gear Draw gear		3	4		7 27		2	1 4
Driving boxes, shoes, wedges, pedestals, and braces		5	7		66	2		
Fire-box sheets.	`  <b>-</b>		4		21			
Flues			1		5			1
Frames, tailpieces, and braces, locomotive Frames, tender		8	4 2		37 3			2
Gauges and gauge fittings, air		2	<u>"</u>		13			
Gauges and gauge fittings, steam		9	2		8			6
Gauge cocks		4	2		9			2
Grate shakers and fire doors		1 4	4	- <b></b>	29 19	<u>-</u> -		
Handholds		· · ·			2			
Injectors and connections		10	7		102	1		9
Inspections and tests not made as required		12	6		213	13	2	<b>2</b> 9
Lateral motion		2 2	2		12			
Lights, cab and classification Lights, headlights			2		3			
Lubricators and shields		1			14			
Mud rings		$\frac{1}{2}$	;-		3 13	2		1
Packing nuts. Packing, piston rod and valve stem	-	10	1 4		36			5 2
Pilot and pilot beams		10			9			
Plugs and studs		1	5		5	1		
Reversing gear		2 9			22			2
Rods, main and side, crank pins, and collars		9	17		115 2	2		- <b></b>
Sanders		3	2		19			1
Springs and spring rigging		13	37		111	5		8
Squirt hoseStay bolts			2		$\begin{bmatrix} 7\\9 \end{bmatrix}$	1 1		2
Stay bolts, broken			7		54	1 1		
Steam pipes		4	3		26	1		1
Steam valves		7			12	- <b></b>		2
StepsTanks and tank valves	-	6	5		33 20	<sub>1</sub> -		3 5
Telltale holes			5		3	l		
Throttle and throttle rigging		4	2		31	2		7
Trucks, engine and trailing	-	5	6		44		;-	1
Trucks, tender Valve motion	-	4 2	13		37 58		1	4
Washout plugs		2	5		40	4		1
Train-control equipment	-	::-			11	- <b></b> ຼ-		
Water glasses, fittings, and shields	-	14 6			30 24	2	1	3
Miscellaneous—Signal appliances, badge plates, brakes	-	5	3		13			4
(hand).	1	_						1
Number of defects		064	246		7 795	EO		127
Number of defects	- 1	264	246		1,735	50	7	137
Locomotives reported	- 64	312	260	28	5, 238	45	25	373
Locomotives inspected.	_  29	415	484	37	8, 983	107	32	332
Locomotives defective Percentage of inspected found defective	- 1 - 3.4	61 15	85		430 4.8	13 12	2 6	35 11
Locomotives ordered out of service		4	4		13	3		î
1		<u> </u>	<u> </u>	1	l	<u> </u>	<u> </u>	<u> </u>

	H															
Philadelphia, Bethlehem & New England	Pittsburgh & Lake Erie	Pittsburg & Shawmut	Pittsburgh & West Virginia	Pittsburgh, Chartiers & Youghiogheny	Pittsburg, Shawmut & Northern	Public Belt R. R. of New Orleans	Reading	Republic Steel Corpora- tion of Alabama	Republic Steel Corpora- tion of Ohio	Richmond, Fredericks- burg & Potomac	Rio Grande Southern	River Terminal	Rutland	St. Johnsbury & Lake Champlain	St. Joseph & Grand Island	St. Louis & Hannibal
3			1				5							- <b></b>		
														- <b></b>		
							<u>î</u> -									
5							5 14 21 19			2						
16			2 2			2	21			1				1	4	
			2				19 5			<u>-</u> -						1
· • • • • •																
1							12			2				1		
2 3							17 3 2 3 8 8 3 4									1
3							3	<b></b>						- <b>-</b>		
1			3				3							1	2	1
			3 1				8	1	<b>-</b>	- <b></b> :				;-	5	
2				<b>-</b>			3			5				1		
1			2		1		4									
						<b>-</b>	7	- <b>-</b>		- <b></b>				1		
1							4			<u>-</u>						
							12	<b>-</b>		1					<b>-</b>	
10	<b></b> -					<b>-</b>	4 24			1					<b>-</b>	
							6			1						1
					;-											
18		2	3 10		$\begin{bmatrix} & 1\\ 2\\ 2 \end{bmatrix}$	1	26 64			9		<u>-</u> -	1 6	4		2 7
					2		1 2									
			,				4									
							4 2 2 3 9									
							2							1		
3							9									
							1									
		<u>-</u> -	2				2									<u>î</u> -
2			8				2 16					2	4			1
			<u>i</u> -				1 8 10			1						
3 2		2					10			3		1	2			2
			1													
			1			[- <b></b>	33 2						<b>-</b>			
							2									
 6		3-	1				1			1 1			L 1		<b></b>	
6 1		3	2				2 3			1 2			i			
<u>-</u> -													<i>-</i>	- <b>-</b>		- <b></b>
							6 10 8							î		2
			1				8			2						2 1
1		2	14				9 2 1			1						
							í									
4		2	5				14			4					1	2
2							8 14	}		<u>2</u> -		1		3	<b></b>	
_																
90	l	13	63		6	3	452	3		46		6	15	15	12	25
					-				-	-			<del> </del>			
39 85	272 360	24 51	30 72	10 5	32 49	16 17	970 1,857	12 4	23 27	98 146	13 12	15 20 2	80 156	11 32	22 66	22 16
85 29 34		51	12 17		2	1 6	146	1		13		2	1 6	32 5	6	11
34 7		3. 9	17		4.1	6	146 8 3	25		9		10 1	3.8	16	9	69

Table XII .- Number of steam locomotives inspected,

	TABLE ZII.	· v ansor	or of	oica	<i>,,,</i>	come		0100	pecieu
	Parts defective, inoperative or missing, or in violation of the rules	St. Louis-San Francisco	St. Louis Southwestern	San Antonio, Uvalde & Gulf	San Diego & Arizona	Sandy River & Rangeley Lakes	San Joaquín & Eastern	Savannah & Atlanta	Seaboard Air Line
1 2 3 4 5 6 7 8	Air compressors Arch tubes Ash pans and mechanism Axles Blow-off cocks Boiler checks Boiler shell Brake equipment	1 2							5 1 3 
9 10 11 12 13 14 15 16	Brake equipment. Cabs, cab windows, and curtains. Cab aprons and decks. Cab cards. Coupling and uncoupling devices. Crossheads, guides, pistons, and piston rods. Crown bolts. Cylinders, saddles, and steam chests. Cylinder cocks and rigging. Domes and dome caps. Dratt gear. Draw gear Driving boxes, shoes, wedges, pedestals, and braces. Fire-box sheets.	1 1 1	1					1	7 3 1 4 1 1 2
17 18 19 20 21 22 23 24 25 26 27 28 29 29 20 20 20 20 20 20 20 20 20 20 20 20 20	Frames, tailpieces, and braces, locomotiveFrames, tender	3 1 1 2	1 <u>1</u> -					1	2 3 4 1 5 2 3 3
31 32 33 34 35	Grate shakers and fire doors	1 1 14 40 1	1 5 27		2				3 2 6 12 1 1
36 37 38 39 40 41 42 43 44	Lights, headlights Lubricators and shields Mud rings Packing nuts Packing, piston rod and valve stem Pilot and pilot beams Plugs and studs Reversing gear Rods, main and side, crank pins, and collars Safety valves Sanders	1 1 1	4						1 1 4 1 1 1 6
45 46 47 48 49 50 51	Salety Valves. Sanders. Springs and spring rigging. Squirt hose. Stay bolts. Stay bolts, broken Steam pipes. Steam valves. Steps. Tanks and tank valves.	2 5 4 1	1 1 2						9 1 5 3 4 4
53 54 55 56 57 58 59 60	Tanks and tank valves. Telltale holes Throttle and throttle rigging. Trucks, engine and trailing. Trucks, tender. Valve motion. Washout plugs. Train-control equipment. Water glasses, fittings, and shields.	5 1	2 1 4 3 4 1					1 2	15 1 6 12 11 14 30
61 62 63	Water glasses, fittings, and shields Wheels Miscellaneous—Signal appliances, badge plates, brakes (hand).  Number of defects	156	112		1  3	1  1		16	7 6 2 232
	Locomotives reported Locomotives inspected Locomotives defective Percentage of inspected found defective Locomotives ordered out of service		256 644 45 7 5	12 37	18 27 2 7	10 11 1 1 9	11 8	16 29 8 28	638 1, 403 104 7 3

			ve, an	u oru	erea	ji one .	86101	<i>co, co</i>		JOH 01	nuv	•					
4	ઋ		SS,	s,	8			ઋ			æ	-B			ş.≱		Т
of Cali-	-	ļ	Lines,	Lines,	Southern Pacific of Mexico	i	7	1		1	Iron &	Terminal R. R. Association of St. Louis		1	Texas Pacific-Missouri Pa- cific Term, of New Orleans		
18	Steel	1	1	ᆲ	ĮΣ	1	Spokane International	Spokane, Portland Seattle	Steelton & Highspire	_	Ä	Ass				1	
		ł	e	gc	00		ati	# o	l dž	8	- T	٦,٠,٢	_	1	ii o	1	
B E	모든	2	Pacific East	BCi	ig.	j	E	P E	ΙĒ	E E	122	St.	Ιğ	la La	12 g	le.	
fig G	FF T	l ∰	中田	₽₽	l &	ļ	直	See	ચ્ચ	0	age is	A 2	l g	Ĭ	Ä.E	Na Va	
Slerra Railway fornia	Sloss-Sheffield Iron	South Buffalo	Southern	Southern Pacific West	臣	E	e	g,	<b>a</b>	Tennessee Central	Tennessee Coal, Railroad	la a	Texas & Pacific	Texas-Mexican	Pac	Tionesta Valley	İ
82	1 2	큠	<del>ថ្</del> មី	축	臣	the	E	Ka Ka	¥	l ä	l g	温ま	S.S	8	as fic	nes	
eg.	ļģ.	1 2	g	<u>5</u>	100	Southern	<u>g</u>	١ڲ	š	l ē	Į.	<u>j</u>	ē	Į į	8.20	1 2	ŀ
	<u></u>	<u> </u>		<u>~</u>	- 01		<u>  "</u>	-01				<u> </u>			<u> </u>		
	L		2	15	ļ	11			1	4					ļ		İ
						11 1 2				4							
						2			·								
			3	3		2											
			3 2 12	15		8			·	;-		1 5 6		ļ			
			12	19		48				1 4		5	1				1
				1 3 4 15 19 3 2 2 2 11 4 10		2 8 4 48 12 4 2 1 39 1 38 6		2	1			6					
			1 3	2		2				1		i					
				2		1				1		ì					1
		 	13	114		39		1 		2		i					1
			3	10		38				2		1 8	2				l î
						6						8					1
			3	2		6		1		2		9					11 11 11 11 11 11 11 11 11 11 11 11 11
			3 3 4 1 1 8	2 1 9 13 2 3 1 4		6 5 23 9 5 48 2 1 6 11 3		<u>i</u> -		1 1 1		9 2 1		1			Į į
		ī	1	13		9		1		1 1		1					2
	- <b>-</b>		1	2		5			1								2
			8	1 1		48		3		7		i-					23
				4		ī				ī							2
			5	14		11		<i>-</i>		1 1 3		4	2				20
		2	5 1 3 1 14 30 1	1 14 13 1		3											2
			3	1		4		2				2					25
		2 2	14	4 37 47 6		1 30 103 4 2 1 5 5 10 5		1		1 11		8 60	1 1	4			31
		2	30	47		103		;-		11		60	1	2			32
						2		1		ī							33
			1	3		1											35
			1 2	2		5			<u>î</u> -					1			36
			2	4		10						5					38
			<sub>1</sub> -	9				3	1								38
			1 1 5 4	3 1 2 4 9 1 2 2		3 6 40				1							41
			5	2		6		<u>2</u> -	1	2							42
												8 					44
			2 7 1	10 51		95				9		<u>4</u> -	- <b>-</b>				4
			i	3		3		5				i					47
				10 51 3 3 14 3 1 1		35 35 7 7			1	2		1					48
			8 2	3		10		3 1		····- <u>2</u> -		<u>i</u> i-		6			49
		<sub>1</sub> -	1	3		4				2 1 1		11 2 18 1					51
1			5 5	10		4 7 16 5 17 47 12		1	1	1 1		18					52
		1		2		5											54
		2	6 9 2 3	2 4 7 1		17 47		ī		1 1							55
			ž	i		12						2 1					57
			3	3 21		12 23		1		3							58
										3		9					59 60
		8-	12	7 19		10		3	1			3 4 3					61
			12	5		10 7		2		1		3		1 2			62 63
	1			•				1		-		•		~			50
		21	194	455		753		35	9	74		187	7	17			
	16																
10		<b>ವ</b> ರ	613	1, 719	26	2, 172 2, 997	11	102	13	37	56	183 183	363	17	13	17	
10 15		49	899 l	1.992	1	2, 997	111	4.0	111	144	7 1	182	her .	יצו	10. 1	A.	
10 15	6	33 49 7	613 899 54	1,992		245	11	145 14	11 4	144 20	7	66	566	18 6	19	6	
		49 7 14 1	899 54 6 4	1,719 1,992 196 10 10		2, 997 245 8 15		145 14 10	36	20 14 4		183 66 36 4	1 .2	18 6 33	19 	6	

Table XII.—Number of steam locomotives inspected,

	_								<u> </u>	_
Parts defective, inoperative or missing, or in violation	- 1		ઝ	1		- 1		are		
Air compressors		Parts defective, inoperative or missing, or in violation of the rules	edo, Peoria Western	edo Terminal	onto, Hamilton Buffalo	સ્ક	ıtah	e inon	ion Pacific	ion
Air compressors			ľoľ	ľoľ	Tor	Tre	Uin	E I	Un	D
2 Arch tubes.  3 Ash pans and mechanism.  4 Atles.  5 Blow-off cocks.  6 Boller checks.  7 Boller shipment.  8 Blow-off cocks.  8 Blow-off cocks.  9 Cab aprons and decks.  1					<u> </u>					
A Arles		Air compressors							10	
8	2	Arch tubes								
8	4	Ash pans and mechanism								
8	5	Blow-off cocks								
8 Brake equipment       1	6	Boiler checks	i	1						
24   Frames, tender	8	Brake equipment	1						34	
24   Frames, tender	9	Cabs, cab windows, and curtains							8	
24   Frames, tender	10	Cab arross and decks		1						
24   Frames, tender		Coupling and uncoupling devices							1	
24   Frames, tender	13	Crossheads, guides, pistons, and piston rods							5	
24   Frames, tender		Cylinders saddles and steam chests							45	
24   Frames, tender	16	Cylinder cocks and rigging							19	
24   Frames, tender		Domes and dome caps							10	
24   Frames, tender		Draw gear								
24   Frames, tender	20	Driving boxes, shoes, wedges, pedestals, and braces							43	
24   Frames, tender	21	Fire-box sheets								
24   Frames, tender	23	Frames, tailpieces, and braces, locomotive							2	
Image	24	Frames, tender	2							
Image	25 26	Gauges and gauge fittings, air							7	
Image	27	Gauge cocks								
Image	28	Grate shakers and fire doors							3	
Water glasses, fittings, and shields	30	Injectors, inoperative								
Water glasses, fittings, and shields	31	Injectors and connections						;-	9	
Water glasses, fittings, and shields	32	Inspections and tests not made as required	2					4	2	
Water glasses, fittings, and shields	34	Lights, cab and classification.								
Water glasses, fittings, and shields	35	Lights, headlights							1	
Water glasses, fittings, and shields		Mud rings							î	
Water glasses, fittings, and shields	38	Packing nuts	1							
Water glasses, fittings, and shields		Packing, piston rod and valve stem						3	1	
Water glasses, fittings, and shields		Plugs and studs							2	
Water glasses, fittings, and shields	42	Reversing gear			<b></b>			;-	1 22	
Water glasses, fittings, and shields		Safety valves								
Water glasses, fittings, and shields		Sanders			.				6	
Water glasses, fittings, and shields		Springs and spring rigging							25	
Water glasses, fittings, and shields		Stay bolts							4	
Water glasses, fittings, and shields	49	Stay bolts, broken							3	
Water glasses, fittings, and shields	50 51	Steam pipes								
Water glasses, fittings, and shields	52	Steps			.	2			2	
Water glasses, fittings, and shields	53	Tanks and tank valves			-			1	6	
Water glasses, fittings, and shields		Throttle and throttle rigging							8	
Water glasses, fittings, and shields	56	Trucks, engine and trailing	.	-	-			1	11	
Water glasses, fittings, and shields		'Trucks, tender			- -~					
Water glasses, fittings, and shields	59	Washout plugs							8	
Wheels   W	60	Train-control equipment	-{	-				-	13	
Miscellaneous.—Signal appliances, badge plates,		I Wheels	_	-						
Locomotives reported	63	Miscellaneous.—Signal appliances, badge plates,					-	-	9	
Locomotives inspected			=-	1		. 2				
Locomotives defective   2   1     1     1     1     2		Locomotives reported	_ 20		18					144
Percentage of inspected found defective 7   4.2   11   10   9		Locomotives inspected	-   29							60
Locomotives ordered out of service		Percentage of inspected found defective	7						9	
·   ·   ·   ·   ·   ·   ·   ·   ·   ·		Locomotives ordered out of service	-	-	-	-	-	-	-  5	

¹ New York Central.

Upper Merion & Ply- mouth	Utah	Virginian	Wabash	Washington Terminal	Western Maryland	Western Pacific	Wheeling & Lake Erie	Wheeling Steel Corporation	Wichita Falls & Southern	Winston-Salem South- bound	Woodward Iron	Wrightsville & Ten- nille	Roads with less than 10 locomotives	Total defects
2		1 1 1 1			3	15 14 11	1 2 -1 1 2 3 1 1 1	1 1 16 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2			1	47 4 4 8 8 1 16 21 18 271 137 62 78 42 91 91 90 46 6 6 78	417 54 69 9 13 144 214 220 1, 645 851 262 162 85 763 50 841 376 45 325 371
1 1 1 1 1 6		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2	1	3 2 3 1 3 2 3 19	3 1 3 2 2 2 3 1 14	2 2 4 2 1 5 1 2 11	1 1 7	4			1	16	821 235 611 86 156 156 214 330 288 382 31 1, 168 3, 801 3, 801 19 119 119 166 402 444 145 176 63 202 1, 263 89 1, 851 96 181 96 181 198 198 198 198 198 198 198 198 198
		1 2	3 1	1	1 2 1 1 7 2 1 5 1 3 14	1 3 2 2 3 10	1 4 4 3 2	7	1				26 98 79 31 27 16 164 3 35 128 17 32	119 166 402 444 145 176 202 1, 256 63 289 1, 851 96 181
1		1 1			2 1 1 2 1 2 1	5 5 5	1 3 2 3		1				32 8 196 108 51 45 93 220 29 56	285 143 622 587 108 434 648 766 520 599 13 676 603 325
18 11 45 6 13	16 4	18 161 184 11 6	7 613 1, 065 1	18 25 1 4	104 253 430 40 9 4	119 174 231 40 17 5	72 176 207 19 9	62 17 22 11 50	10 18 19 4 21	11 15	14	3 13 19 1 5	4, 203 2, 220 2, 879 837 29 149	27, 832 59, 110 96, 924 7, 724 8 527

Table XIII.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives

Road	Perc	entag	e insp	pecte	d đe	fec-		Or	dered	out of s	service	
rosu	1932	1931	1929	1927	1925	1923	1932	1931	1929	1927	1925	1923
Akron, Canton & YoungstownAlabama, Tennessee & NorthernAliquippa & SouthernAliquippa & SouthernAlton	16	14	47	42	56	38	1 3	1	12	1 2	5	0
Allabama, Tennessee & Northern	30	28 0	37 31	56 26	53 69	78 0	0	1 3 0	1 0	0	1 0	0
Alton	ŏ	0	3	14	35	75	0	0	3	5	9	29
Ann Arbor	0	0.	9	25 24	71	97	0	0	.0	2 40	15 30	29 24 84 0 1 6
Atchison, Topeka & Santa Fe Atlanta & St. Andrews Bay	7	8 18	14 43	30	32 50	49	4 0	9	14 0	40	30	0
Atlanta & West Point	1	4	6	9	23 54	27	0	0	Ô	1	4	1
Atlanta, Birmingham & Coast 1	4.3	4.3	27	40	54	78	1	0	2	8 0	12	6
Atlanta & St. Aldiews Bay Atlanta & West Point Atlanta, Birmingham & Coast Atlantic & Yadkin Atlantic Coast Line	3.7 13	6 14	10 10	16 30	100 35	58	9	0 7 3 8 1	1 2	4	0 15	45
Baltimore & Ohio, Lines East	5	4.1	15	30	52	62	4	3	10	32 1	113	153
Baltimore & Ohio, Lines East	5	4.7	17	49		50	6	8	17	72 3	<sub>1</sub> -	<u>-</u>
Bangor & Aroostook	3.9 18	5 4.3	31 35	43 54	28 51	66	1 2	0	1 4	5	4	6 6 2
Bessemer & Lake Erie	18 2. 2	12	22	21	63	43	2	1 1	6	1	1	2
Birmingham Southern	0	0	14	100	0	-::-	0	0	0	0 0	0 10	<del></del> 7
Boston & Albany	13 10	15 13	16 16	26 23	47 36	54 67	3 5	0 6	0 3	13	23	191
Bangor & Aroostook Belt Railway of Chicago Bessemer & Lake Erie Birmingham Southern Boston & Albany Boston & Maine Buffalo & Susquehanna Buffalo Creek Buffalo, Rochester & Pittsburgh Burlington-Rock Island 3 Camas Prairie Canadian National 4 Canadian Pacific Carnegie Steel	7	14	21	23 29	54	57	5 2	3	11	3	0	1
Buffalo Creek	.0	0	10	18	0	69	0	0	0	0 9	0 26	12
Bunalo, Rochester & Pittsburga	11 22	9	10 18	14 41	51 61	58	8	8	ŏ	2	4	13 2
Camas Prairie	40	47	16				1	0	0			
Canadian National	23	37	34	50	50	84	1 4	5 2	7	30	24 0	4
Canagia Pacinc Carnegia Steel Carolina & Northwestern Central of Georgia Central R. R. of New Jersey Central Vermont	29 0	25 1.4	32 15	44 34	56 48	76	0	ő	0	5	3	4 5 0 1 10 139
Carolina & Northwestern	8	7	32	50	50	36	ŏ	0	1	0	3	1
Central of Georgia	12	20	19	30	37 47	33 77	1	10 2	5 14	10 20	8 46	10
Central R. R. of New Jersey	13 4	13 11	42 12	38 11	27	47	0	ī		1	2	4
Charleston & Western Carolina Chesapeake & Ohio 5		16	28	58 28	27 63	68	1 3	1	1 2	2	2 2	1
Chesapeake & Ohio	7 5	9	17	28 38	49 64	68 75	3	5 3	5 3	26 25	29 31	58 77
Chesapeake & Ohio * Chicago & Eastern Illinois. Chicago & Illinois Midland. Chicago & North Western. Chicago & Western Indiana. Chicago, Burlington & Quincy. Chicago, Great Western. Chicago, Indianapolis & Louisville. Chicago, Indianapolis & Louisville. Chicago, Milwaukea St Paul & Pacific.	0	12	28 14	83	04	10	0	1 0	0	29	31	1
Chicago & North Western	4.9	0 7	12	19	35	67	1	5	8	18	29	193
Chicago & Western Indiana	8 3.5	25 6	43 14	22	86 46	67	0	0		0 39	185	176
Chicago, Great Western	29	26	11	22 21 20 29	40	52	3 27	23	18 2 2 5 0	0	10	176 20 13
Chicago, Indianapolis & Louisville	-6	11	26	29	45	57	0	1 1	2	14	7	13
	4.6 8	4.5	9	13	27 70	48 62	1 0	0	5	9	12 5	58
Chicago River & Indiana Chicago, Rock Island & Pacific	12	11	17	29	55	76	31	17	13	49	124	367
Chicago, St. Paul, Minneapous &			1	ļ	1		ļ					
Omaha Chicago Short Line	9 32	9	17 44	30	46	70	0	2 0	6	12	20	54 0
Chicago, West Pullman & Southern Cleveland, Cincinnati, Chicago & St. Louis 6	0	7	47	53	100	58	ŏ	Ö	5	1	7	ŏ
Cleveland, Cincinnati, Chicago & St.			]	1								
	4 20	6 9	24 38	34	44 76	67 68	1	3	16 5	37 0	47 1	77 10 71 0
Colorado & Southern	4,4	8	43	25 40	76	81	0	2	10	4	$5\hat{2}$	71
Colorado & Wyoming	6	0	21	27 21	15	14	0	Ō	I	3	2	0
Colorado & Southern	14 14	17 16	25 58	21	26	44	0	1 0	0 2	0	0	1
Copper Range	13	18	28	84	59	75	0	ĺ	1	7	7	0
Cumberland & Pennsylvania	19	12	29	13	20	25	Ō	0	1	0	0	0
Davenport, Rock Island & North- western.	3.4	3	19				0	0	2			
Delement & Hudson	1.5	2.7	2.6	9	24	62	0	0	0	1	2	52 47
Delaware, Lackawanna & Western Denver & Rio Grande Western Denver & Salt Lake	10	11	21	22	36 58	62	6	3 7	17	88	3 72	174
Denver & Rio Grande Western	5	10	36 19	54 44	68	92 93	0	6	32	7	30	173
Detroit & Mackinac Detroit & Toledo Shore Line	12	41	33	36	68 82	26	ŏ	Ó	0	0	2	Ŏ
Detroit & Toledo Shore Line	7 21	10	8	33 46	51 72	78 76	0	0	0	1 0	5 7	174 8 0 3 0 7
Detroit Terminal	1.3	18 3.8	31 5	15	28	29	ŏ	ŏ	Ö	3	4	7
Detroit & Toledo Shote She Detroit Terminal Detroit, Toledo & Ironton Donora Southern Duluth & Northeastern Duluth, Missabe & Northern.	46	5 27	0	ő		ő	7	0	0	ŏ		Ó
Duluth & Northeastern	60 1.6		37 1	12	27	74	0	0	0	ō	<u>i</u> -	2
Duluth, South Shore & Atlantic	9	10	24	29	37 35	69	1	1	4	2	5	3
Duluth, South Shore & Atlantic  East Broad Top R. R. & Coal Co  East St. Louis Junction	9	13	25 27	46	44	67	0	2	0	1	0	1 1
East St. Louis Junction	17	17	1 27	46	59	100	0	0	1 0	0	1	1

See footnotes at end of table.

Table XIII.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives—Continued

	Perc	entag	e ins	pecte	d de	fec-		Or	dered	out of	service	
Road			tive	•						1		
	1932	1931	1929	1927	1925	1923	1932	1931	1929	1927	1925	1923
East Tennessee & Western North Carolina.  Elgin, Joliet & Eastern.  Erie.  Florida East Coast.  Fort Smith & Western.	42 .7 3.8 0 16	33 .7 13 1.4 71	30 4.7 45 7 49	45 13 30 21 60	82 68 39 22 62	17 50 70 22 87	5 0 7 0	0 0 17 0 29	1 0 137 0 5	2 1 41 0 5	1 58 26 0 2	0 1 100 0 2
Fort Worth & Denver City. Galveston, Houston & Henderson	3.8 0 52 0 8 4.9 8 2.3	5 0 57 1.1 7 8 13	13 0 47 11 28 31 45	23 8 55 12 33 47 58	36 0 62 34 46 67 59	27 22 46 28 61 76 59 70	0 2 0 3 0 0 4 2	2 0 5 0 0 5 2 0	2 0 2 3 4 42 1	3 0 2 0 27 1 15	8 0 3 2 31 9 26	4 0 1 5 26 262 0 7
Gulf Coast Lines. Gulf, Colorado & Santa Fe <sup>8</sup> Gulf, Mobile & Northern High Point, Thomasville & Denton Houston Belt & Terminal Huntingdon & Broad Top Mountain R. R. & Coal	9 20 15 0	7 18 18 1.4	19 22 33 8	47 23  44	45 38  78	62	3 8 0 0	3 0 0 0	6 1 0 0	31 2 4	32 7  0	6
Illinois Central Illinois Terminal Indiana Harbor Belt Indianapolis Union International-Great Northern Interstate Jacksonville Terminal	11 15 .8 0 1.1 68 0	12 32 0 14 7 42 0	10 29 1 13 5 60 50	14 40 14 30 27 83 0	30 12 52 26 29 94	43 68 36 66 78	26 0 0 0 1 4	22 4 0 1 1 1 0	14 1 0 0 0 4 0	35 0 0 4 11 6	30 0 18 0 9 6	48 4 2 16 3
Kansas City Southern  Kansas City Terminal  Kansas, Oklahoma & Gulf  Kentucky & Indiana Terminal  Loka Fric & Fastern	2, 1 0 5 9 0 19	1.9 0 1.3 3.7 0	7. 9 24 1 8	26 24 6 39	52 80 43 0	92 88 50 79	0 0 0 0 0	0 0 0 0 1	1 0 1 0	12 0 1 1	11 2 1 0	121 3 0 10
Lake Superior & Ishpeming Lake Superior Terminal & Transfer Lake Terminal Lehigh & Hudson River Lehigh & New England Lehigh Valley Litchfield & Madison Long Island Los Angeles & Salt Lake	22 6 12 5 8 33 0 13	0 10 14 12 10 20 10	10 56 25 21 39 75 59 24	21 20 26 26 84 48 26	44 50 14 65 36 55 35 51	67 0 60 70 71 66 80	0 0 0 4 0 0	0 1 0 0 8 0 0	0 1 1 4 42 3 2 3	0 0 0 2 14 8 3 1	1 0 1 5 26 4 1	2 0 0 10 219 
Louisiana & Arkansas Louisiana & Northwest Louisiana, Arkansas & Texas Louisville & Nashville McCloud River McKeesport Connecting Macon , Dublin & Savannah Maine Central 19	4. 4 41 32 6 25 0 41 10	15 17 26 9 0 0 9	50 33 29 0 24 27	41 25 0 56 42	36 57 63 64 41	75 68 46 0 60 68	0 2 3 1 0 0 5	3 0 2 6 0 0 4	32 0 0 0 1	54 0 0 10 6	94 0 0	136 0 0 0 15
Maryland & Pennsylvania	27 8 2. 1 7 35	24 19 0 7 12	42 36 1 9 25	50 57 42 17	85 66 40 35	58 75 72 57	1 0 0 2 1	0 6 0 2 0	3 9 0 1 0	38 1 7	4 44 2 6	4 22 0 49
Marie Minnesota & International Minnesota, Dakota & Western Minnesota Transfer Mississippi Central Missouri & North Arkansas Missouri-Illinois	8 0 25 12 31 4 2	13 0 31 12 68 0	26 21 32 14 72	13 29 33 71 32 92	25 54 100 67 32 91	60 75 100 97 59 100	0 0 0 2 0 5 0	0 0 1 0 8 0	5 0 0 0 1 8	2 0 1 8 2 17	4 1 3 1 4 12	14 2 3 35 35 22
Missouri Ratisas 1 et as Missouri Pacific Mobile & Ohio Monongahela Connecting Monongahela Montour Mon	.3 2.8 12 9 .7 0	.6	1 9 14 31 8 0	13 20 29 53 16 0	42 59 38 43 9	91 89 52 14 0	0 6 1 1 0 0	0 2 2 1 0 0	0 6 6 3 0	6 24 19 5 1	22 131 11 0 1 0	286 393 6 0 0
Montpelier & Wells River	12 0 0 21 9	24 0 4 13 10	37 0 0 7 14	34 44 52 32 25	74 25 92 31 43	77 0 100 54 60	1 0 0 0 3	14 0 0 0 8	15 0 0 0 0 6	17 1 1 2 19	37 0 21 1 27	46 0 2 0 78

See footnotes at end of table.

Table XIII.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives—Continued

	_										
Per	centag			d de	efec-		Orde	ered ou	it of se	rvice	
1932	1931	1929	1927	1925	1923	1932	1931	1929	1927	1925	1923
		25 24 12 38 23 24 13 12 1 22 12 50 33	41 31 23 36 44 42 45 29 22 6 27 17 47 44	66 48 39 44 48 49 45 37 12 6 42 11 44 61	61 70 73 71 53 78 57 61 32 57 61 35 60 76	4 5 4 2 0 3 0 1 0 4 4 0 13	7 10 2 3 0 2 3 22 0 0 4 2 0 3 3	22 30 0 16 0 9 2 6 0 0 0 2 1 153	55 14 5 10 0 24 4 50 0 0 2 4 1 335	59 47 12 6 1 24 5 28 0 0 3 6 0 5 73	53 36 131 7 163 10 113 0 12 13 13 1687
12 6 11	30 40 12	14 21	23 38	31 57	54 83	3 0 1	5 0 3	0 8	0 14	1 21	1 68
34 0 3.9 17 0 4.1 6 8 25 0 9 0 10 3.8	21 1.9 4 32 3.6 11 13 100 12 14 0 6	65 6 4 57 0 8 13 33 17 67 18 0 71	74 12 0 39 17 25 5 42 40 100 30 70 43 12	76 10 47 0 53 28 48 67 82 43 62 70 44	67 27 52 33 86 57 59 27 62 58 100 0 54	7 0 0 4 0 0 0 0 0 0 0 0 0	1 0 0 4 0 1 5 1 3 0 0 0	16 0 0 30 0 1 1 31 0 10 1 0 5	14 0 0 8 0 2 0 22 0 9 1 1 8	2 0 0 0 0 0 2 26 0 3 2 8 0	2 10 2 0 0 2 12 0 0 3 3 2 0 0
9 69 3.6 7 0 7 9 0 28	21 51 3. 9 8 0 13 10 0	11 43 14 4.3 0 38 0 0 80	36 57 22 22 36 30 62 20 67	38 100 49 47 59 55 7	43 100 88 86 72 44	0 0 3 4 5 0 0 0	0 0 7 1 4 0 2 0 0	0 1 7 2 0 4 0 0	0 0 12 22 5 3 1 0	1 5 65 14 5 0 1	1 2 346 54 4 1
0	0 75	-88	0 86			0	0	····ō	0		23
14 6 10 8 0 10 36 14 0 36 2 33	39 3.3 11 0 9 22 19 14 7 32 0 27	5 24	13 27	30 33	0 47 38 59 37 60 89 50 76 62 50	1 4 10 15 0 0 0 4 0 4 0	8 1 13 0 15 0 1 1 0 0 4 0 0	0 3 47 2 13 0 1 0 14 0 0	1 10 50 3 38 0 2 2 40 0 3 3	0 37 51 1 56 0 4 23 0 1	0 28 24 177 2 13 63 0 6 91 1
0 7 4, 2 0 11 0 10 9 0 13	0 100 25 5 0 0 13 9 11 28 0 17	4 38 65 45 0 67 0 4 17 9 60 11 22	10 17 88 35 0 20 0 16 20 29 62 4 50	57 80 87 3 58 75 18 30 80 26 58	83 100 93 41 0 0 41 10 19 75	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 2 0 0 0 0 1 2 1	0 2 4 0 0 0 0 0 0 8 2 7 0	0 2 7 0 0 2 0 0 17 0 8 0 2 2	2 7 2 0 3 0 1 19 0	0 0 4 3 0 26 2 2 45 89 2
	19322 5 9 9 11 15 10 8 13 12 2 17 3 14 1 16 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1932 1931  5 7 9 10 11 136 10 6 8 9 13 16 12 20 30 15 11 15 16 16 48 10 12 30 0 48 10 11 12 34 21 11 12 34 21 11 34 21 12 30 0 4.1 3.6 6 8 13 100 0 10 8 16 16 16 8 13 100 0 0 12 10 0 0 10 3.8 6 16 9 21 10 0 0 0 12 4 17 7 13 9 10 12 10 0 10 0 10 0 10 0 11 10 10 0 10	1932   1931   1929	1932   1931   1929   1927   1932   1931   1929   1927   1931   194   1	1932   1931   1929   1927   1925   1931   1929   1927   1925   1931   1931   1929   1927   1925   1931	1932   1931   1929   1927   1925   1923   1931   1929   1927   1925   1923   1928   1927   1925   1923   1928	1932   1931   1929   1927   1925   1923   1932   1932   1932   1933   1932   1933   1932   1933   1932   1933	1932   1931   1929   1927   1925   1923   1932   1931   1931   1929   1927   1925   1923   1932   1931   11   14   12   23   39   73   4   2   15   36   38   36   44   71   2   3   31   36   38   36   44   71   2   3   31   36   34   45   35   30   0   36   34   45   35   30   0   36   34   45   35   30   0   36   34   45   35   30   0   36   34   45   35   36   36   36   36   36   36   3	1932   1931   1929   1927   1925   1923   1932   1931   1929   1937   1925   1923   1932   1931   1929   1931   1949   1931   14   12   23   39   73   4   2   0   15   36   38   36   44   71   23   31   16   24   45   45   57   0   3   2   22   12   32   0   0   0   0   3   4   4   48   53   0   0   0   0   3   4   4   48   53   0   0   0   0   3   4   4   48   53   0   0   0   0   3   4   4   48   53   0   0   0   0   3   4   4   48   53   0   0   0   0   3   4   4   5   5   7   0   3   2   2   2   2   2   2   2   2   0   0	1932   1931   1929   1927   1925   1923   1932   1931   1929   1927   1925   1923   1932   1931   1929   1927   1928   1932   1931   1929   1927   1928   1932   1931   1929   1927   1931   1932   1931   1929   1927   1931   1932   1931   1929   1927   1931   1932   1931   1929   1927   1931   1932   1931	1932   1931   1929   1927   1925   1923   1932   1931   1929   1927   1925   1923   1932   1931   1929   1927   1925   1923   1932   1931   1929   1927   1925   1925   1923   1932   1931   1929   1927   1925

See footnotes at end of table.

Table XIII.—Summary of comparison of the percentage of steam locomotives inspected and found defective, with the number ordered out of service for the years ended June 30, on roads reporting on 10 or more locomotives—Continued

Road	Perc	entag	ge insj tive		d de	fec-		Or	dered	out of	service	
	1932	1931	1929	1927	1925	1923	1932	1931	1929	1927	1925	1923
Western Maryland Western Pacific. Wheeling & Lake Erie. Wheeling Steel Wichita Falls & Southern. Winston-Salem Southbound Woodward Iron Company Wrightsville & Tennille Less than 10 locomotives, discontinued	50 21 0	13 16 8 35 18 22 75 3. 2	26 25 42 50 4 33 29 12	42 19 55 87 0 50 60 24	54 36 67 100 87 56 57 54	76 37 74 100 77 50 29	4 5 2 0 1 0	1 5 1 3 1 0 0	3 9 7 0 1 0 0	13 1 10 4 0 0 0	22 13 20 0 6 1 0 3	90 9 31 1 1 0 0
roads, and miscellaneous	29	32	40	51	56	56	149	185	307	515	532	357
All roads	8	10	21	31	46	65	527	688	1, 490	2, 539	3, 637	7, 075

NOTE.—Omitted statistics not comparable, due to consolidations, separations, changes in corporate identity, carrier not in existence in year shown, less than 10 locomotives, etc.

- 1 Atlanta, Birmingham & Atlantic prior to 1927.
  2 Statistics prior to 1927 included in Baltimore & Ohio, East.
  3 Trinity & Brazos Valley prior to 1931.
  4 Includes Grand Trunk Western, 1925–1927.
  5 Includes Grand Trunk Western, 1925–1927.
  5 Includes Peoria & Eastern prior to 1931.
  7 Included in Canadian National, 1925–1927.
  8 Included in Atchison, Topeka & Santa Fe, 1923.
  9 Included Alabama & Vicksburg, Gulf & Ship Island, Vicksburg, Shreveport & Pacific, and Yazoo & Mississippi Valley, 1927–1932.
  10 Includes Portland Terminal, 1932.
  11 Includes Ohio Central Lines, 1927–1932.
  12 Included in Cleveland, Cincinnati, Chicago & St. Louis prior to 1931.
  13 Included in New York Central Lines East last 5 months, 1932.

  15 Included in New York Central Lines East last 5 months, 1932.

Fractional percentages not shown unless per cent defective is less than 5, otherwise nearest numeral is given.