### INTERSTATE COMMERCE COMMISSION

#### TWENTY-FIFTH ANNUAL REPORT

OF THE

# CHIEF INSPECTOR BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

FISCAL YEAR ENDED JUNE 80, 1936



UNITED STATES
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# ANNUAL REPORT OF THE CHIEF INSPECTOR BUREAU OF LOCOMOTIVE INSPECTION

OCTOBER 1, 1936.

To the Interstate Commerce Commission:

The past fiscal year marked the completion of a quarter of a century of Federal locomotive inspection and a brief statement of the reasons for the law and the accomplishments during that period are given below.

Because of frequent explosions and other accidents due to the use of defective locomotive boilers and appurtenances thereto resulting in loss of life and injuries to employees and others there was a movement among the railway employees toward the enactment of a Federal law requiring that the railroads maintain their locomotive boilers in safe and serviceable condition.

The Locomotive Boiler Inspection Act was approved on February 17, 1911, after having been given consideration by committees of the Senate and the House for a period of 2 years.

The act, which became effective on July 1, 1911, set up a general safety standard and made provision for formulation and promulgation of rules and regulations which, after a specified procedure, became obligatory upon the carriers.

Authentic records as to the number of casualties caused by defective boilers and their appurtenances prior to the enactment of the Locomotive Boiler Inspection Act are not available, but table A shows a comparison of the number of persons killed and number of persons injured as a result of failure of some part or appurtenance of the locomotive boiler for the first year in which the act was operative and for the year ended June 30, 1936.

TABLE A

Boiler and its appurtenances only	Year end	led June
		1936
Number of persons killed	91 1, 005	10 80

The total number of persons killed as a result of failures of locomotive boilers and their appurtenances in the period shown was 717, and the total number of injured was 8,771. If the casualties had occurred at the same rate throughout the period as they occurred in the first year in which the act was effective, there would have been 2,275 persons killed and 25,125 injured.

The defective condition in which many locomotive boilers and their appurtenances were being operated when the act became effective was disclosed by our inspections. Cracks in boiler shells; improperly designed patches which greatly reduced the strength and safety of the boiler; excessive pitting and grooving; broken, loose, and defective braces; numerous broken and defective stay bolts and crown stays; firebox sheets cracked and leaking; and excessive accumulations of mud and scale on crown sheets and in firebox water legs due to improper washing of the boilers were some of the existing conditions.

During the first year there were 3 boiler shell explosions in which 27 persons were killed and 41 injured and 94 crown sheet and fire-box failures in which 54 persons were killed and 168 injured. The number of locomotives ordered from service by our inspectors for necessary repairs was 3,377. In addition, the following locomotives were required to be strengthened or changed to comply with the requirements of the law or permanently removed from service:

Number having pressure reduced to insure a proper factor of safety	699
Number having seams reinforced by welt plates to insure a proper factor of	
safety	327
Number permanently removed from service on account of defective con-	
dition	698
Number having lowest reading of water glass raised to comply with the	
law	<b>992</b>
Number having the lowest gage cock ordered raised to comply with the	
law	408
Number ordered strengthened by having braces of greater sectional area	
$oldsymbol{a} ext{pplied}$	351
Number requiring additional support for crown sheet	116

It will thus be seen that during the first year a total of 6,968 locomotives were either held out of service for repairs or changed and strengthened to conform to the requirements of the law or permanently removed from service.

Due to the necessity of maintaining their boilers and appurtenances in better condition than heretofore the railroads thereafter concentrated their efforts on conditioning their boilers, with resultant neglect of other parts of the locomotives. Accidents caused by failures of parts of the locomotive other than the boiler and its appurtenances began to increase, with resultant loss of life and injury to employees and others. The employees, through their various organizations, again appealed to Congress for relief, and the Boiler Inspection Act

was amended to include the entire locomotive and tender and later was amended to include all locomotives regardless of the source of power.

When the machinery rules became effective, the need was apparent. These rules are almost an exact copy of the rules filed with the Commission by more than 170 of the leading railroads of the country who certified that they were the rules then in force on their respective roads.

The general attitude was to subordinate the making of needed repairs to the requirements of convenience. Although the railroads had inspection rules that were adequate for the purpose, little if any attempt was made to make immediate repairs if any inconvenience would be caused thereby, and as with the boiler, locomotives in known bad condition were continued in use until application of needed repairs seemed to be more convenient, or until failure occurred which often resulted in deaths or injuries. The attitude at that time is well illustrated by the following excerpt from a letter from the receiver of an important railroad to a then assistant chief inspector of this Bureau:

It is a very different thing for an association to adopt rules or standards to which the railroads shall work, or for railroads themselves to adopt rules from which they may themselves vary, and having a law which the Federal Government at Washington may enforce literally and absolutely.

The expressions "That's good enough", "Hurry up and get her out", "We will get that next trip", and kindred expressions were very common at that time and were responsible for many accidents caused by defects in the locomotives.

Our endeavor has been to have necessary repairs made promptly and properly, and the wisdom of this policy is illustrated in the improved condition of the locomotives, enabling them to make longer runs, reduction in the number of killed and injured due to failures, and greatly increased mileage per engine failure.

During the fiscal year 1917, the first full year after the law was extended to include the entire locomotive and tender, there were 616 accidents resulting in 62 killed and 721 injured while in the fiscal year ended June 30, 1936, there were 209 accidents resulting in 16 persons being killed and 215 injured.

The results obtained by this Bureau in the quarter of a century of its existence in promoting the safety of the employees and travelers on the railroads, due largely to regular and more thorough inspection and repairs, speaks well for the framers of the law and the insight of those who secured its enactment. Due credit is also given to the tireless and conscientious attention to their duty of our corps of inspectors throughout the life of the locomotive boiler inspection law and amendments.

Plates illustrating some of the boiler explosions and failures of parts of locomotives which resulted in deaths or injuries and investigated by this Bureau in the earlier years of enforcement of the law are shown on pages 71 to 88, and illustrations of accidents and defective parts for the fiscal year ended June 30, 1936, are shown on pages 47 to 67.

REPORT OF THE CHIEF INSPECTOR OF LOCOMOTIVES

In compliance with section 7 of the act of February 17, 1911, as amended, the Twenty-fifth Annual Report of the Chief Inspector, covering the work of the Bureau during the fiscal year ended June 30, 1936, 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—										
	1936	1935	1934	1933	1932	1931					
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.	49, 322 97, 329 11, 526 12 852 47, 453	51, 283 94, 151 11, 071 12 921 44, 491	54, 283 89, 716 10, 713 12 754 43, 271	56, 971 87, 658 8, 388 10 544 32, 733	59, 110 96, 924 7, 724 8 527 27, 832	60, 841 101, 224 10, 277 10 688 36, 968					

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

	Year ended June 30—											
	1936	1935	1934	1933	1932	1931						
Number of accidents.  Percent increase or decrease from previous year.  Number of persons killed.  Percent increase or decrease from previous year.  Number of persons injured.  Percent increase or decrease from previous year.	209 1 4. 0 16 44. 8 215 19. 5	201 1 4. 7 29 1 314. 3 267 1 19. 7	192 1 22. 3 7 12. 5 223 12. 9	157 1 8. 3 8 11. 1 256 1 64. 1	145 36. 9 9 43. 7 156 42	230 22 16 1 23 269 15. 9						

<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—													
	1936	1935	1934	1933	1932	1931	1915	1912						
Number of accidents Number of persons killed Number of persons injured	75 10 80	68 24 119	63 4 77	53 3 55	43 8 46	91 15 122	424 13 467	856 91 1,005						

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

Table IV.—Number of casualties classified according to occupation—Steam locomotive accidents

				Yes	ar ended	l June 3	0-				
	19	36	19	35	19	34	19	33	1932		
Killed Injured		In- jured	Killed	In- jured	Killed	In- jured	Killed	In- jured	Killed	In- jured	
Members of train crews: Engineers Firemen Brakemen Conductors Switchmen Roundhouse and shop em-	4 6 3	75 72 28 13 2	7 4 2	65 70 26 10 <b>3</b>	1 1 1 1	57 73 32 17 6	2 1	58 48 17 10 8	3 4 2	59 49 18 7 3	
ployees: Boiler makers Machinists Foremen Inspectors Watchmen Boiler washers Hostlers Other roundhouse and shop employees	1	3 2 1 3 3	1 	6 3 2 1 1 1	1	2 5 3 4 5	2	1 2 1 3 1		1 1 1 5	
Other employees Nonemployees Total		5 4 215	29	49 22 267	7	$\frac{\frac{4}{14}}{223}$	3 8	102 256	9	156	

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

	Year ended June 30—								
	1936	1935	1934	1933	1932				
Number of locomotive units for which reports were filed Number inspected	2, 361 3, 118 252	1, 911 1, 620 146	1, 288 1, 436 69	1, 349 1, 368 74	1, 274 1, 411 57				
Percentage inspected found defective	8 11 674	9 5 <b>44</b> 7	5 4 158	4 176	6 126				

Table VI.—Accidents and casualties caused by failure of some part or appurtenance of locomotives other than steam

		Year ei	ided Jun	e 30→	
		1935	1934	1933	1932
Number of accidents	9	8	1	2	2
Number of persons killed Number of persons injured	9	8	1	2	3

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

	<u> </u>			Υe	ar ende	d June	30—			
	19	936	19	35	19	934	19	133	19	32
	Killed	In- jured	Killed	In- jured	Killed	In- jured	Killed	In-	Killed	In-
Members of train crews: Engineers Firemen Brakemen Roundhouse and shop employees: Inspectors		7		3 1 1				2		1
Other roundhouse and shop employees		1		2 1		1				i
Total		9		8		1		2		

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

						Yea	ar en	ded .	June	30—						
Part or appurtenance which caused		1936	1		1935	i		1934			1933			1932		
accident	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	
Air reservoirs Aprons Arch tubes Ashpan blowers. Axles Blow-off cocks Boiler checks Boiler explosions: A. Shell explosions Crown sheet; low water; no contributory causes found C. Crown sheet; low water;	1 1 -1 -4 3	8	1 1  4 3	1 3 1 3 6 2	17	1 3 1 -20 6 2	1 6 2 1 5 4	4	1 6  1 5 4  18	1 1 1 5 8	3	1 1 1 16 8	1	5	1  6	
contributory causes or defects found.  D. Miscellaneous firebox fail-	2		3	5	4	8	1		3	 			1	3	3	
Brakes and brake rigging. Couplers. Crank pins, collars, etc. Crossheads and guides Cylinder cocks and rigging. Cylinder heads and steam chests. Dome caps. Dratt appliances. Dratt appliances. Draw gear. Fire doors, levers, etc. Filues. Filue pockets. Footboards. Gage cocks. Grate shakers. Handholds. Headlights and brackets.	1 13 8 4 1 1 5 1 3 1 1 7 8	2	2 13 11 4 	1 8 6 6 2 2 1 3 6 1 4 7	3 1	8 7 6 2 2 1 1 3 6 1 4 7	1 7 9 2 2 2 3 1 1 4 4	2	1 11 10 2 3 2 3 2 3 1 1 4 8	5 8 2 3 4 1 1 1 3 5	1	5 9 2 2 2 87 1 1 3 6	2 10 3 4 3 1 1 1 2 4	1	2 11 4 4 3 1 1 1 	

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

						Yea	reno	led J	une :	30—						
Part or appurtenance which caused		1936		1935			1934			1933				1932		
accident	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	
Injectors and connections (not including injector steam pipes) Injector steam pipes. Lubricator steam pipes. Lubricator glasses. Patch bolts. Pistons and piston rods. Plugs, arch tube and washout. Plugs in firebox sheets. Reversing gear Rivets. Rods, main and side. Safety valves. Sanders. Side bearings. Springs and spring rigging. Squirt hose. Stay bolts. Steam piping and blowers. Steam piping and blowers. Steam valves. Studs. Superheater tubes. Throttle glands. Throttle rigging. Throttle rigging, trailing, or tender. Valve gear, eccentrics and rods.	1 1 1 1 2		1 2 19 1 5 1 2	1 6 1 1 7 2 5 1 1 1 1 1 1 1 1 1 5 5		2 6 1 1 2 2 1 1 1 1 1 1 1 1 1 5 5	1 3 2 2 1 3 3 9 1 4 1 1 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1	1 3 	4 1 2 2 2 2 8 3 2 4 2 1 3	1	4 1 2 3 8 3 -2 4 -1 1 1 4	1 1 3 1 1 1 2 8 3 10 2 2 1 1 1 6 7		11 13 11 	
Water glasses	2 5 46	2	17 2 4 45	1 47	2	8 -1 45	11 1 46		11 1 47	11 -4 33	i	11 8 32	1 29		2	
Total	209	16	215	201	29	267	192	7	223	157	8	256	145	9	150	

 $\begin{array}{c} \textbf{TABLE IX.--} Accidents \ and \ casualties \ resulting \ from \ failures \ of \ locomotives \ other \\ than \ steam, \ and \ their \ appurtenances \end{array}$ 

	Year ended June 30—														
Part or appurtenance which caused	1936			1935			1934			1933			1932		
accident	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Fires due to overflowing or leakage of fuel.  Insulation Pantagraphs and trolleys. Third-rail shoes. Miscellaneous  Total.	5		4 5	1 1 1 8		1 1 1 8	1		1  1	1  1 2		1  1 2	1 1 1 		1 1 1

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	360/360/ 766/ 886/	20 80 80 80 80 80 80 80 80 80 80 80 80 80	CTIVE STEAM LOCOMOTIVES TO ACCIDENTS AND CASUALTIES RESULTING FROM LOCOMOTIVE FAILURES
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	1919 1920 1921 1923 1924 1925	784 (832) 964 742 (823) 964 742 (933) 735 622 (930) 735 622 (930) 537 467 467 467	CHART SHOWING
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	1922	16.5 TAS	0 40
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FISCAL YEARS ENDED	19/2 19/3 19/4	65.7 % 60.3% 60.3% APPLYS	AELATION OF DEFE
$\Box$			

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

	Ports defective increasing or missing or in		Ye	ear ended	June 30		
	Parts defective, inoperative or missing, or in violation of rules	1936	1935	1934	1933	1932	1931
1.	Air compressors. Arch tubes. Asbpans and mechanism.	740	733	660	474	417	481
2.	Arch tubes	74 79	74 94	127 87	51 40	54 69	60 81
3.	Axles	13	10	6	21	13	10
4. 5.	Blow-off cocks	236	283	289	210	144	191
6.	Boiler checks	356	413	407	293	214	263 430
7.	Boiler shell	383 2, 480	396 2,449	372 2,326	296 1,696	220 1,645	1, 923
8.	Brake equipment	1, 638	1, 273	1,342	1, 183	851	1, 484
10.	Cab aprons and decks	450	368	343	309	262	415
11.	Cab cards	166	142	129	121	162	211 98
12.	Coupling and uncoupling devices	65 1,056	73 1, 086	54 1, 100	67 773	85   763	856
13. 14.	Crossheads, guides, pistons, and piston rods Crown bolts	63	75	7, 100	67	50	96
15.	Cylinders, saddles, and steam chests	1,717	1, 547	1, 491	1,084	841	1, 265
16.	Cylinder cocks and rigging	605	627	654 105	374 76	376 45	411 83
17.	Domes and dome caps Draft gear	114 513	94 423	401	318	325	568
18. 19.	1)row goor	451	414	480	<b>3</b> 57	371	640
20.	Driving boxes, shoes, wedges, pedestals, and braces.	1,712	1, 573	1, 472	1,080	821	925
21.	rirebox sheets	295	343	356 203	246 150	235 120	341 187
22. 23.	Flues. Frames, tail pieces, and braces, locomotive	178 997	173 1,006	951	669	611	740
24.	Frames, tender	113	124	128	80	86	105
25.	Gages and gage fittings, airGages and gage fittings, steam	257	275	212	145	156	192
<b>2</b> 6.	Gages and gage fittings, steam	350	320	289 <b>3</b> 84	258 388	214 330	324 415
27. 28.	Gage cocks	579 400	480 394	404	245	288	410
29.	Handholds	502	464	377	363	382	562
30.	Injectors, inoperativeInjectors and connections	40	39	33	20	31	55
31.	Injectors and connections	2, 085 9, 005	2, 035 8, 344	1, 909 8, 173	1, 357 6, 358	1, 168 3, 801	1, 815 4, 862
32. 33.	Inspections and tests not made as requiredLateral motion.	9,005 404	389	351	269	237	289
34.	Lights, cab and classification	78	81	79	76	55	77
95	Lights headlight	251	257	218	169	119	180
36.	Lubricators and shields	255 237	191 241	$\frac{215}{247}$	157 232	119 166	176 318
37. 38.	Lubricators and shields.  Mud rings Packing nuts	508	527	491	419	402	523
39.	Packing, piston rod, and valve stem Pilots and pilot beams	1, 133	906	833	592	444	706
40.	Pilots and pilot beams	178	152	174	123	145 176	160 182
41.	Plugs and studs	236 463	167 414	242 390	151 254	202	299
43.	Rods, main and side, crank pins, and collars	2, 093	1, 826	1, 670	1,327	1, 256	1, 520
44.	Safety valves	125	100	108	53	63	61
45. 46.	Sanders	678 3, 008	779 2, 765	697 2, 854	376 2, 122	289 1, 851	$\frac{314}{2,161}$
47.	Springs and spring rigging	134	113	107	93	96	184
48.	Stay holts	279	240	285	219	181	293
49.		520	512	455 489	368 338	552 285	938 512
50. 51.	Steam valves.	526 227	463 212	267	193	143	226
52.	Steps	615	640	567	498	622	676
53.	Tanks and tank valves	877	913	862	600	587	732
54. 55.	Telltale holes. Throttle and throttle rigging Trucks, engine and trailing	127 760	102 733	93 639	90 448	108 434	151 574
56.	Trucks engine and trailing	861	811	898	664	648	714
57.	Trucks, tender	1, 108	1, 120	918	747	766	1,059
58.	Valve motion	824	799	784	640	520	497
59. 60.		714	679 4	776 8	623 4	599 13	815 9
61.	Water glasses, fittings, and shields	1, 118	951	907	716	676	955
62.	Wheels	790	697	734	580	603	750
63.	Miscellaneous—Signal appliances, badge plates, brakes (hand)	608	563	572	423	325	418
	Total number of defects	47, 453	44, 491	43, 271	32, 733	27, 832	36, 968
	Locomotives reported	49, 322	51, 283	54, 283	56, 971	59, 110	60, 841
	Locomotives reported	97, 329	94, 151	89,716	87,658	96, 924	101, 224
	Locomotives defective	11,526	11,071	10, 713	8,388	7,724	101, 224 10, 277
	Percentage of inspected found defective Locomotives ordered out of service	12 852	$\frac{12}{921}$	12 754	10 544	8 527	10 68 <b>8</b>
	LOCOLIOUIYES OLUBICU OUL UL SELVICE	002	841	104	044	047	1 000

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

Parts defective, inoperative or missing, or in			Year end	ed June	30—	
violation of rules	1936	1935	1934	1933	1932	1931
Air compressors Axles Batteries	-  e		5 3	2	2 8	4
Bollers	- 5					
					13	23
Cabs and cab windows	_ 30	33				
Controllers, relays, circuit breakers, and switch groups	- 10		i i	1		ĭ
Current-confecting annarating	1 10	3	5 3			- 3
Diant gear	1 04					,
Diaw gest			.   0	0		
Driving Doxes, shoes, wedges nedestals and nedestal	1		-		- 2	
Draces	1 2	5	7	1	- 4	6
Figures, tall nieces, and brokes				2		. 2
Fuel tank, its piping and valves	. 44	15		ī		
Gages and gage fittings, air	. 6	4		. 1 2		i
Gears and pinions			- 1			
High-lension equipment not properly quarded against	1	3				
accidental contact Inspections and tests not made as required.	20	7		.  <b></b>	.  2	4
Insulation	186	124		58	23	41
Illernal-compustion engine defects including posts		. 8	2	2		
and appnances	23	4	4	18	1	
Jack Shates	l i	1 -	1 *	1 10		1
	2		. 3	l i	2	$\begin{bmatrix} 2\\1 \end{bmatrix}$
	6	1		1	1 4	3
Digito, neadingin.	4	2		3	ĺi	3
Meters, volt and ampere						2
Motors and generators Pilots and pilot beams	14	5	4	8	1	10
Quills	] 6	5		4		2
Rods, motor, main and side, drive shafts						Ī
panders	2 25	10	4	2		1
Springs and spring rigging, driving and truck	29	21 20	2			4
steam pines	29	20	4	8	9	10
Switches, hand-oberated, and fuses	2	2	1		<b></b>	1
118HSOUTHERS, resistors and rhanging		í	1 1	4		1
	42	46	3	7	2 5	
water glasses, littings, and shields	4	6		'	1	11
w neers	26	Ğ	8	5	11	12
Whistles, bells, and train-signal system	1					2
Miscellaneous	39	25	7	7	9	16
Total defects	674	449	158	176	126	192
Locomotive units reported				====		
	2, 361	1,911	1, 288	1, 349	1, 274	1, 242
LIOCOLLOLIVE INNES detective	3, 118	1,620	1, 436	1, 368	1, 411	1, 256
Eticelliage inspected found defective	252	146	69	74	57	75
Locomotive units ordered out of service.	8	9	5	5	4	6
	11	5	4	4	6	3

## 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 recurrence 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.

#### STEAM LOCOMOTIVES

There was an increase of 8 in the number of accidents occurring in connection with steam locomotives, a decrease of 13 in the number of persons killed, and a decrease of 52 in the number of persons injured compared with the previous year.

The chart on page 8 shows the relation between the percentage of defective steam locomotives and the number of accidents and casualties resulting from failures thereof, and illustrates the effect of operating locomotives in defective condition.

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 inspections and repairs made in accordance with the requirements of the law and rules, many accidents will be avoided.

During the year 12 percent of the steam locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before the locomotives were put into use; this percentage has remained the same during the past 3 years. There was a reduction of 7.5 percent in the number of locomotives ordered withheld from service by our inspectors because of the presence of defects that rendered the locomotives immediately unsafe.

Detailed results of our inspections of steam locomotives of each railroad are shown in table XII, and a comparison of the condition of locomotives of each railroad over a period of years is shown in table XIII.

#### CROWN SHEET FAILURES AND OTHER BOILER ACCIDENTS

Boiler explosions caused by crown sheet failures continue to be the source of most of the fatal accidents. There was a decrease of 3 accidents, a decrease of 13 in the number of persons killed, and a decrease of 52 in the number of persons injured from this cause, as compared with the previous year. Eight persons were killed in such failures; this represents 50 percent of all fatalities that occurred during the year. Eight persons were injured in accidents caused by crown sheet failures; this represents 3.7 percent of all injuries that occurred during the year.

Other boiler and appurtenance accidents, including the failure of a side sheet due to overheating caused by negligence in not washing the boiler as often as water conditions required, resulted in the death of 2 persons and the injury of 72 persons.

Compared with the first year in which the Boiler Inspection Act was effective there was a reduction of 91 percent in the number of accidents, a reduction of 89 percent in the number of persons killed, and a reduction of 92 percent in the number of persons injured.

#### EXTENSION OF TIME FOR REMOVAL OF FLUES

One thousand one hundred and fifteen applications were filed for extensions of time for removal of flues, as provided in rule 10. Our investigations disclosed that in 92 of these cases the condition of the locomotives was such that extensions could not properly be granted. Seventy-five were in such condition that the full extensions requested could not be authorized, but extensions for shorter periods of time were allowed. One hundred and twenty-four extensions were granted after defects disclosed by our investigations were required to be repaired. Twenty-eight applications were canceled for various reasons. Seven hundred and ninety-six applications were granted for the full periods requested.

#### LOCOMOTIVES PROPELLED BY POWER OTHER THAN STEAM

There was an increase of one in the number of accidents occurring in connection with locomotives other than steam and an increase of one in the number of persons injured as compared with the previous year. No deaths occurred in either year.

During the year 8 percent of the locomotives inspected by our inspectors were found with defects or errors in inspection that should have been corrected before the locomotives were put into use as compared with 9 percent in the previous year. There was an increase of 6 in the number of locomotives ordered withheld from service by our inspectors, because of the presence of defects that rendered the locomotives immediately unsafe.

Changes or modifications in some of the rules for inspection and testing of locomotives other than steam became effective on May 1, 1936. These changes were designed to clarify the applicability of certain rules to the various types of heating equipment involved and to reduce the fire hazard incident to the use of liquid fuels, particularly the fuels used in internal combustion engines.

Special hazards accompany the use of internal-combustion engine driven equipment due to the volatility and inflammability of the liquid fuels. Eight fires from this cause have been recorded in the past year; four of the fires caused personal injuries, but all may have resulted in major disasters had it not been for fortunate circumstances.

The principal causes of these fires are overflowing through fuel reservoir vent pipes or carburetors when the reservoirs are being filled due to lack of proper means to indicate the height of fuel in the reservoirs or to inattention on the part of persons performing the filling operation, flooding of carburetors when the engines are in operation, and inability to control the engine speed due to unsuitable throttle mechanism or defective speed governors.

If fires are to be avoided, it is incumbent upon the carriers to see that all practical mechanical safeguards are provided and maintained in good operating condition, and that all who are charged with the duty of filling the reservoirs be fully informed as to the proper and safe procedure and the results that may accrue through inattention or carelessness.

#### SPECIFICATION CARDS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 164 specification cards and 3,732 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, 578 specifications and 96 alteration reports were filed for locomotive units and 538 specifications and 182 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.

#### APPEALS

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

JOHN M. HALL, 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, 1936, 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.]

#### ALIQUIPPA & SOUTHERN RAILROAD:

April 11, 1936, locomotive 213, Aliquippa, Pa. Spring hanger broke; one injured.

One accident; one injured.

#### ALTON RAILROAD:

September 20, 1935, locomotive 4332, Roodhouse, Ill. Injector overflow valve bonnet blew out; threads on bonnet and in injector body were badly worn: one injured.

April 8, 1936, locomotive (B. & O.) 1, Chicago, Ill. Steam drum manhole cover gasket blew out along the bottom of cover plate for a distance of 10 inches; gasket made of a folded asbestos strip which was molded with the fold toward the pressure side, permitting the pressure to separate the folds; cover plate inside of the shoulder did not approximately fill the manhole area; one injured.

Two accidents; two injured.

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

August 4, 1935, locomotive 4115, Ethel, Mo. Raked off side of cab by a water crane while going to front end to oil a hot guide; guide overheated account of lubrication washed away by a leak from crack in elbow under boiler check; "Spanner nut under left boiler check leaks" was reported at end of previous trip; one injured.

August 5, 1935, locomotive 3412, near Carrollton, Mo. Latch to grate shaker post was broken, permitting shaker lever to unexpectedly move backward and catch employee's finger between post and back stop; one injured.

\*August 20, 1935, locomotive 3705, Pan, Ariz. Blow-off cock pipe became

disconnected at union with muffler, allowing pipe to drag; one injured.

\*\*August 27, 1935, locomotive 2513, near Mulvane, Kans. Squirt hose burst; hose defective: one injured.

\*\*October 12, 1935, locomotive 3704, Winslow, Ariz. Steam-heat throttle valve locked while operating handle was being turned; "Steam heat valve does not open wide" was reported on October 14; one injured.

November 27, 1935, locomotive 804, Barstow, Calif. Tank step turned, due to being loose, causing employee to fall; step supported by only one bolt; one

injured.

\*February 3, 1936, locomotive 3403, Ormonde, Ill. Driving wheel tire broke;

one injured.

February 20, 1936, locomotive 3162, near Emporia, Kans. Undesired emergency application of brakes caused by defective brake pipe vent valve on tender; one injured.

\*\*February 29, 1936, locomotive 4082, near Argyle, Iowa. Drain cock lost

off nipple in bottom of main air reservoir; one injured.

May 1, 1936, locomotive 3166, near Davenport, Okla. Top rung of tender end ladder failed through old fractures where secured to side frames; one injured. May 17, 1936, locomotive 1039, Pampa, Tex. Crown sheet failure caused by

overheating due to low water; one killed.

\*\*May 28, 1936, locomotive 597, Los Angeles, Calif. Tender truck brake beam

truss rod failed; one injured.

\*\*June 30, 1936, locomotive 3247, Gallup, N. Mex. Vertical cab handhold at gangway fouled on steel support to tender deck when locomotive was backed on a curve, crushing employee's finger; one injured. Thirteen accidents; one killed, 12 injured.

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#### ATLANTA, BIRMINGHAM & COAST RAILROAD:

August 26, 1935, locomotive 210, near Chelsea, Ala. Injector steam pipe pulled out of improperly applied collar at connection to fountain throttle; bracket supporting injector was broken which permitted injector to work on boiler and the movement of injector caused the 10-foot steam pipe which was not provided

with a clamp to vibrate and break away from the collar; three injured.

April 16, 1936, locomotive 75, Waycross, Ga. Top section of coal gate slipped from guide provided to hold it in position, causing employee to fall; coal gate too short to fit in guides located on water legs each side of tender; one injured.

May 22, 1936, locomotive 207, near Union City, Ga. Crown sheet failure caused by overheating due to low water; one injured.

Three accidents: five injured.

#### ATLANTIC COAST LINE RAILROAD:

July 13, 1935, locomotive 479, Tampa, Fla. Wrench slipped off grease plug to main rod; old grease plug in grease cavity made unusual exertion necessary to force the grease to pin; corners of wrench slightly worn; one injured.

December 18, 1935, locomotive 1543, Winokur, Ga. Steam pipe broke off at top flange. Pipe had apparently been unduly stressed when making the joint at the superheater header; one injured.

\*\*January 30, 1936, locomotive 1699, Homerville, Ga. Driving box running

hot; one injured.

February 11, 1936, locomotive 1731, near Mount Holly, S. C. Wrist pin worked out of crosshead and the disconnected main rod punctured outside and inside throat sheets of firebox; cotter keys securing wrist pin nut were too small and not located close enough to nut to serve their purpose; two killed.

\*\*March 20, 1936, locomotive 433, Gainesville, Fla. Automatic bell ringer did not operate properly; bell ringer not properly lubricated and a long cotter pin in actuating cylinder of ringer fouled on bell yoke causing cylinder to stick; one injured.

Five accidents; two killed, four injured.

#### BALTIMORE & OHIO RAILROAD:

July 25, 1935, locomotive 7537, Stanley, Pa. Employee stepped in front of a moving train on adjacent track when he went to open sand pipes which were stopped up due to heavy rainfall. Locomotive was slipping very badly; locomotive riding on trailing truck frame at the back end on both sides; "Adjust the weight on the low pressure engine; cannot keep from slipping" was reported by engineers on July 16 and 17, and inspector reported "Engine is down on trailer frame at back end, both sides" on July 17, 19, 20, and 25; one killed.

\*\*September 14, 1935, locomotive 4253, Hamden, Ohio. Leading locomotive separated from locomotive 4253, due to pin which held drawbar on pilot of locomotive 4253 working up account of eather large size.

motive 4253 working up, account of cotter key missing, causing drawbar to raise

and permit drawbars to pass; one injured.

\*\*October 13, 1935, locomotive 5044, Niles Junction, Ohio. Clear vision window frame turned over in door frame, causing glass to fall out and strike employee; the top screws for securing window frame in door were missing; screw holes badly worn; one injured.

\*November 6, 1935, locomotive 5229, Athens, Ohio. Tool box on top of tender cistern located 12 inches back of coal space, permitting employee's foot to drop between wall of coal space and tool box and cause him to fall over the tool box; one injured.

\*February 19, 1936, locomotive 2609, Zanesville, Ohio. Hose missing from

steam line at rear of tender; one injured. Five accidents; one killed, four injured.

#### BOSTON & ALBANY RAILROAD:

April 23, 1936, locomotive 44, Worcester, Mass. Fire tube broke off at front flue sheet; tube had been excessively rolled in the sheet and was badly pitted;

June 29, 1936, locomotive 1445, Allston, Mass. Water glass broke; one injured. Two accidents: two injured.

BOSTON & MAINE RAILROAD: January 27, 1936, locomotive 936, Smith's Ferry, Mass. Driving spring hanger broke at slot for the gib, due to old fracture covering approximately 60 percent of cross-sectional area; one injured.

\*February 14, 1936, locomotive 1428, Hudson, Mass. While assisting to handle reverse lever, the lever came back quickly and caught employee's arm between lever and back of cab; one injured.

Two accidents; two injured.

#### CENTRAL RAILROAD OF NEW JERSEY:

\*\*December 5, 1935, locomotive 11, Elizabethport, N. J. Injured account of unusual effort necessary to change position of reverse lever; locomotive reported very hard to reverse on December 3, 4, 5, 6, and 11; one injured.

\*\*December 29, 1935, locomotive 139, Jersey City, N. J. Grate shaker bar fouled on rear wall of cab; shaker bar improper fit on post and was 8 inches longer

than company's standard for this locomotive; one injured.

Two accidents; two injured.

#### CHESAPEAKE & OHIO RAILWAY:

July 18, 1935, locomotive 134, Walbridge, Ohio. Blow-off pipe union disconnected: one injured.

February 28, 1936, locomotive 3006, near Marion, Ohio. Low coupler at rear of tender permitted separation of train, resulting in emergency application of the brakes; two injured.

Two accidents; three injured.

#### CHICAGO & EASTERN ILLINOIS RAILWAY:

February 19, 1936, locomotive 1023, Hillsdale, Ind. Side rod broke through defective weld and end of broken rod punched hole through outside throat sheet and back flue sheet; one killed, one injured.

One accident; one killed, one injured.

#### CHICAGO, BURLINGTON & QUINCY RAILROAD:

\*September 5, 1935, locomotive 7005, Merino, Colo. Union link broke near crosshead connection; old fracture covered approximately 75 percent of crosssectional area; one injured.

\*\*December 21, 1935, locomotive 704, Ashland, Nebr. Reverse gear difficult to operate, due to counterbalance spring out of adjustment and link block too

close fit in the link; one injured.

December 29, 1935, locomotive 7006, Crawford, Nebr. Employee's foot caught on grate lever, causing him to fall; grate lever and fulcrum casting improperly located; one injured.

\*\*January 25, 1936, locomotive 5238, near Anselmo, Nebr. Eccentric rod broke due to old fracture extending through 40 percent of cross-sectional area;

one injured.

\*\*June 14, 1936, locomotive 4973, Downer's Grove, Ill. Tank-box door worked open and struck employee's arm while he was shoveling coal; catch on tank-box door defective; one injured.

Five accidents; five injured.

#### CHICAGO GREAT WESTERN RAILROAD:

August 30, 1935, locomotive 858, Hayfield, Minn. Grate shaker bar slipped off post due to improper fit; shaker post burred, preventing shaker bar from going on it properly; one injured.

October 11, 1935, locomotive 757, Harlan, Iowa. Ashpan tumbling shaft broke through defective weld at tumbling shaft fulcrum arm; one injured.

\*\*December 29, 1935, locomotive 932, Oelwein, Iowa. Union in injector overflow pipe, located about 12 inches above cab deck, failed when boiler check stuck open; threads on overflow pipe and in union connection defective and overflow pipe not clamped; one injured

January 20, 1936, locomotive 870, Oelwein, Iowa. Flue pocket blew out of

front flue sheet; one injured.

Four accidents: four injured.

#### CHICAGO, INDIANAPOLIS & LOUISVILLE RAILWAY:

\*January 28, 1936, locomotive 285, Lafayette, Ind. Tender handhold broke off in threads between nut and top of tank sill; one injured. One accident; one injured.

#### CHICAGO, MILWAUKEE, ST. PAUL & PACIFIC RAILROAD:

\*\*July 14, 1935, locomotive 6161, Elmwood Park, Ill. Brake rod safety hanger became detached from locomotive, due to nuts coming off the bolt securing it to binder, and struck crossing watchman; one injured.

\*\*November 28, 1935, locomotive 7044, near Garrison, Mont. Coupler knuckle on locomotive opened allowing locomotive to part from train, resulting in emergency application of the brakes; cotter key improperly spread and protruded beyond the lock block lifter, preventing lock block from dropping into proper position: two injured.

Two accidents: three injured.

#### CHICAGO, ROCK ISLAND & PACIFIC RAILWAY:

October 6, 1935, locomotive 850, Havana, Ark. Reverse lever moved violently to front end of quadrant due to broken valve ring catching in port; left front valve bull ring and two valve rings broken; one injured.

One accident; one injured.

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

September 26, 1935, locomotive 505, South Range, Wis. Main steam pipe in front end failed; minimum thickness of steam-pipe wall not more than three-

sixty-fourths inch; one injured.

\*\*May 14, 1936, locomotive 386, near Fairchild, Wis. Reverse lever unlatched and moved suddenly to front end of quadrant, crushing employee's leg between lever and air pipes; stop pin missing from quadrant, and insufficient clearance around reverse lever when in extreme forward position; one injured.

Two accidents; two injured.

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

\*February 22, 1936, locomotive 7422, Connersville, Ind. Insufficient clearance between handhold on cab and bumper plate on tank step; one injured. One accident; one injured.

#### CLINCHFIELD RAILROAD:

December 4, 1935, locomotive 304, Johnson City, Tenn. Defective bull's-eveblew out of water gage; one injured.

One accident; one injured.

#### Colorado & Southern Railway:

January 13, 1936, locomotive 70, Golden, Colo. Crown sheet failure caused by overheating due to low water; gage cock dripper almost entirely stopped tupwith loose scale; one injured.

One accident; one injured.

#### DELAWARE, LACKAWANNA & WESTERN RAILROAD:

August 28, 1935, locomotive 24, Bloomfield, N. J. Employee slipped and fell from pilot beam account of oil on pilot beam; one injured.

\*\*December 2, 1935, locomotive 1103, near Rockaway, N. J. Employee's eye injured by glass from broken cab window; one injured.

December 18, 1935, locomotive 1137, Tobyhanna, Pa. Fire tube broke off at

safe end weld; overheated in welding; two injured.

March 24, 1936, locomotive 1101, Oxford Furnace, N. J. Fire tube failed at

defective safe end weld; two injured.

May 7, 1936, locomotive 1225, near North Alexander, N. Y. Crown sheet

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

May 17, 1936, locomotive 373, Binghamton, N. Y. Cotter keys in throttle lever and throttle lever latch pins too long and sharp points on ends of keys; one

Six accidents; three killed, seven injured.

#### DENVER & RIO GRANDE WESTERN RAILROAD:

August 31, 1935, locomotive 1401, Detour, Utah. Driving-wheel tire slipped inward, causing derailment. Tire was insecurely applied. Lateral motion device worn to such extent that it permitted in excess of 2 inches free lateral movement

of wheels; one killed, one injured.
\*September 11, 1935, locomotive 478, Farmington, N. Mex. Nut worked off

bolt securing inspirator operating lever; one injured.
October 3, 1935, locomotive 955, Salt Lake City, Utah. Bell rope broke; bell. rope had become tightly wound around the bell crank and prevented bell from ringing; one injured.

\*\*March 7, 1936, locomotive 1519, La Veta, Colo. Driving-box journal ranhot. "Engine pounding both sides; adjust driving-box wedges; examine packing in left front and both main driving-box cellars" was reported on March 6; one injured.

June 8, 1936, locomotive 1212, Roper, Utah. Pilot beam handhold gave way at one end; handhold not properly secured; one injured.

Five accidents: one killed, five injured.

#### DULUTH, SOUTH SHORE & ATLANTIC RAILWAY:

\*\*December 5, 1935, locomotive 716, Humboldt, Mich. Headlight and lights in cab failed while en route. After attempting repairs to headlight, employee fell from running board due to his hold on handrail on side of cab being broken by coming in contact with center supporting bracket; one injured. One accident: one injured.

ERIE RAILROAD:

September 17, 1935, locomotive 3360, Gulf Summit, N. Y. Power reverse gear wheel spun when force was applied; gear stuck due to bolt which secured inside radius bar to reverse yoke working outward and fouling on gear connecting rod; cotter, nut, and collar missing from the bolt; threads on bolt in poor condition; one injured.

November 16, 1935, locomotive 2454, Pompton Lakes, N. J. Spark arrester

fell from smokestack of locomotive: one injured.

\*\*December 22, 1935, locomotive 3397, Shenango, Pa. Two grate carrier bars broke at trunnions and dropped out of position causing grates to bind; grate side frames not properly secured in brackets, allowing frames to tip towards center and cinders filling in between frames and side sheets wedged frames towards center, eliminating clearance between grate carrier bars and side frames; one

December 24, 1935, locomotive 4123, Maplewood, Pa. Sliding plate at front end of tender trough stuck in grooves and could not be moved to cover the opening above stoker conveyor screw at main crusher. While attempting to open another slide, while stoker was in operation, slide hook slipped out of hole in slide and caused employee to step back into this opening, resulting in fatal injury; one injured.

January 8, 1936, locomotive 2915, near Susquehanna, Pa. Left front side rod broke through main crank-pin eye, causing both back side rods to break and broken back rod punctured outside and inside throat sheets; front rod broke through dowel hole at bottom of crank-pin eye due to old fracture comprising approximately 90 percent of cross-sectional area; two injured.

February 20, 1936, locomotive 3159, near Brockway, Pa. Headlight generator failed; mica insulation between the bars of commutator too high; top brush not properly surfaced to fit contour of commutator; surface of commutator badly worn and heavily coated with carbon; "Lights are out; won't burn" was reported on February 15; one injured.

March 19, 1936, locomotive 3013, Cortland, Ohio. Valve gear connecting rod

broke; metal in rod defective; one injured.

Seven accidents; eight injured.

#### FLORIDA EAST COAST RAILWAY:

\*October 14, 1935, locomotive 445, Daytona Beach, Fla. Engine truck box running hot; one injured.

One accident; one injured.

#### GEORGIA & FLORIDA RAILROAD:

\*September 27, 1935, locomotive 408, Midville, Ga. Crank arm failed through old fracture near main crank pin; one injured. One accident; one injured.

#### GREAT NORTHERN RAILWAY:

August 6, 1935, locomotive 2513, St. Paul, Minn. Extension handle of injector steam operating valve became disconnected, due to cotter key missing from fitting connecting the operating valve stem to extension handle. When employee leaned out cab window to determine cause of injector failure he was struck by a semaphore signal stand and fell to the ground; one injured.

\*November 15, 1935, locomotive 1192, Coteau, N. Dak. Injured while attempting to straighten drain pipe from water glass so that water would drain

through the hole in deck; one injured.

\*February 7, 1936, locomotive 2181, Nickerson, Minn. Brake rigging broke:

one injured.

March 31, 1936, locomotive 2054, Havre, Mont. Automatic bell ringer inoperative, and bell very difficult to ring by hand; bell crank at front of engine not applied according to company's standard: one injured.

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May 13, 1936, locomotive 86, Fargo, N. Dak. Reverse lever slipped out of quadrant and moved suddenly to back end of quadrant, crushing employee's foot between lever and seat box platform; one injured.

June 20, 1936, locomotive 1709, near Carlisle, Minn. Driving spring hanger broke in two places at slot for spring gib; old fractures at points of failure; one

Six accidents: six injured.

#### GULF, COLORADO & SANTA FE RAILWAY:

April 18, 1936, locomotive (A. T. & S. F.) 1973, DeRidder, La. Insufficient clearance between wooden strip to which cab awning was attached and horizontal cab handrail; two center bolts for securing awning strip to angle iron were missing, permitting the wooden strip to bow out in the center; one injured.

One accident: one injured.

#### GULF, MOBILE & NORTHERN RAILROAD:

\*February 1, 1936, locomotive 111, Mantee, Miss. Whistle cord broke; one injured.

One accident: one injured.

#### ILLINOIS CENTRAL RAILROAD:

July 25, 1935, locomotive 7005, Gilman, Ill. Eccentric rod broke; injured while attempting to operate reverse gear after rod was removed; one injured.

August 3, 1935, locomotive 3001, Centralia, Ill. Water glass burst; one injured. August 14, 1935, locomotive 1189, Terry, Miss. Employee who was standing along the side of track was struck by a driving box flange liner which was thrown from passing locomotive; flange liner broke off account of defective welding: one injured.

December 3, 1935, locomotive 1567, Lyle, Minn. Water glass broke: one

December 20, 1935, locomotive 315, Cedar Rapids, Iowa. Insufficient clearance between cab handhold and corner of tender deck when on sharp curve; one

January 6, 1936, locomotive 1839, near West Frankfort, Ill. Water glass burst, breaking both glasses in water-glass shield; top water-glass cock inoper-

ative due to not being properly packed; one injured.

February 28, 1936, locomotive 366, Memphis, Tenn. Handle of air-compressor steam valve came off, causing employee to fall from running board; handle not properly secured. Piston packing to air cylinder to front compressor was leaking and employee went to running board to tighten packing nut; one

May 12, 1936, locomotive 674, Selma, Miss. Front cross-equalizer hanger broke, due to old fractures on both sides at root of threads, letting locomotive

down on front driving boxes and resulting in derailment; one injured.

June 10, 1936, locomotive 1529, near Effingham, Ill. Right back section of grates became disconnected; cotter key missing from pin at bottom end of shaker post, permitting pin to work out; one injured.

Nine accidents: nine injured.

#### LEHIGH VALLEY RAILROAD:

October 16, 1935, locomotive 4020, Standing Stone, Pa. Locomotive separated from moving train, causing severe application of the brakes; one injured.

\*\*April 6, 1936, locomotive 371, Allentown, Pa. Gage cock packing nut worked off; one injured.

Two accidents; two injured.

#### Louisville & Nashville Railroad:

December 17, 1935, locomotive 1449, Latonia, Ky. Blow-off cock leaking; coil spring in blow-off cock for securing valve on seat was broken; one injured.

\*December 29, 1935, locomotive 2065, Jemison, Ala. Coupler pulled from

front of locomotive; one injured.

March 12, 1936, locomotive 2148, Louisville, Ky. Main crank pin broke through fillet between side-rod and main-rod bearings; old fracture covering approximately 90 percent of cross-sectional area; rods reported on February 8. 13, 23, and March 4, 7, 10, and 11; one injured.

June 17, 1936, locomotive 979, Theodore, Ala. Driving brake adjusting screw worked loose; one injured.

Four accidents: four injured.

#### MICHIGAN CENTRAL RAILROAD:

\*\*September 4, 1935, locomotive 7873, South Lansing, Mich. Handhold missing from back of tender coal space; one injured.

One accident; one injured.

### MINNEAPOLIS, St. Paul & Sault Ste. Marie Railway:

August 22, 1935, locomotive 2442, near Ladysmith, Wis. Employee's hand injured by sliver from cab window frame; window frame worn and splintered; one injured.

January 29, 1936, locomotive (C. P.) 2648, Thief River Falls, Minn. While closing cylinder cocks, employee's hand struck on cotter key protruding from

part of screw type reverse gear; one injured.

February 2, 1936, locomotive 2437, Noyes, Minn. Safety valve had excessive

blow-back; one injured.

\*\*March 3, 1936, locomotive 1005, Owen, Wis. Snow flanger operating shaft

arm bent, causing flanger to be too low; one injured.

\*\*May 30, 1936, locomotive 2447, Glenwood, Minn. Stepped on a nail which protruded above cab roof; improper repairs made to light bracket at cab roof; one injured.

Five accidents; five injured.

#### MISSOURI & ARKANSAS RAILWAY:

\*January 9, 1936, locomotive 40, Elk Ranch, Ark. Loose driving wheel tire slipped, causing derailment; one injured. One accident; one injured.

#### MISSOURI-KANSAS-TEXAS LINES:

\*February 12, 1936, locomotive 528, Love Field, Tex. Water glass burst;

one injured.

\*\*April 1, 1936, locomotive 13, Oklahoma City, Okla. Water glass burst; one April 10, 1936, locomotive 44, Parsons, Kans. Water glass burst; one injured. May 10, 1936, locomotive 635, Coffeyville, Kans. Water glass burst; one

injured. Four accidents; four injured.

#### MISSOURI PACIFIC RAILROAD:

\*December 23, 1935, locomotive 6612, Nebraska City, Nebr. Tender truck spring broke, causing derailment of locomotive, tender, and three cars; nine leaves in spring showed whole or partial old breaks; one injured.

One accident; one injured.

#### MOBILE & OHIO RAILROAD:

February 4, 1936, locomotive 470, near Columbia, Ill. Boiler check stuck open due to excessive lift; one injured.

One accident: one injured.

#### NASHVILLE, CHATTANOOGA & St. Louis Railway:

\*February 28, 1936, locomotive 356, Maxwell, Tenn. Nozzle of fire hose worked loose and fell off, striking employee's head; one injured.

One accident: one injured.

#### NEW YORK CENTRAL—LINES EAST:

March 1, 1936, locomotive 2771, near Fullers, N. Y. Rivet blew out of patch on boiler back head; rivet head broken off; one injured. One accident; one injured.

#### NEW YORK CENTRAL—LINES WEST:

November 4, 1935, locomotive 2483, Wick, Ohio. Headlight wire broke near fuse connection in terminal box; one injured.

\*\*November 9, 1935, locomotive 2842, Mina, Ohio. Undesired application

of the brakes, caused by failure of forestalling appliance; one injured.

\*\*May 23, 1936, locomotive 417, Cleveland, Ohio. Reverse gear crept forward, eatching employee's hand between reverse lever handle and latch handle; air reverse cylinder piston rod packing blowing; one injured.

Three accidents; three injured.

NEW YORK, CHICAGO & St. LOUIS RAILROAD:

July 10, 1935, locomotive 910, North Creek, Ohio. Injector steam pipe parted at union at top of injector as threads in spanner nut stripped off threads in adapter connection on injector body; spanner nut out of round and threads reduced, causing a loose fit; union had been reported leaking on July 7 and 8; injector bracket broken off through top stud hole; one injured. One accident; one injured.

NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

August 30, 1935, locomotive 389, Roxbury, Conn. Driving-spring hanger broke at slot where cross equalizer was attached; old flaw covered about 50 percent of cross-sectional area; one injured.

October 14, 1935, locomotive 1318, Naugatuck, Conn. Tender-truck brakebeam head broke through old fracture covering approximately 75 percent of cross-sectional area; one injured.

May 5, 1936, locomotive 3240, Hopewell Junction, N. Y. Front coupler pocket pulled off: one injured.

Three accidents; three injured.

NEW YORK, ONTARIO & WESTERN RAILWAY:

July 18, 1935, locomotive 254, Middletown, N. Y. Water glass burst; top water-glass cock was leaking badly and water-glass shield had been removed while attempting repairs; one injured.

\*January 29, 1936, locomotive 404, Trout Brook, N. Y. Employee's arm was pierced by a piece of wire used to hold stoker operating lever which would not stay up; one injured.

Two accidents: two injured.

#### NORFOLK & WESTERN RAILWAY:

November 8, 1935, locomotive 2091, Charles Town, W. Va. Employee's arm was struck by handle of rapidly revolving reverse-gear wheel; valve gear radius trunnion bolt broke through cotter-key holes, permitting bolt to work out and foul gear connecting rod or bell crank temporarily preventing further movement of reversing piston; bolt had been improperly drilled for cotter key and had old fracture at point of failure; one injured.

December 21, 1935, locomotive 2072, Portsmouth, Ohio. Throttle-stem pack-

ing blew out; one injured.

January 7, 1936, locomotive 2088, East Radford, Va. Valve-gear radius bar trunnion bolt worked out of position and fouled valve-gear connecting rod, resulting in reversing-gear wheel spinning and its handle striking employee's arm; retaining nut, washer, and cotter key missing from bolt and threads on bolt badly worn: one injured.

January 29, 1936, locomotive 2033, Phoebe, Va. Reversing gear stuck in central position, then released suddenly and handle of the spinning hand wheel struck employee; low-pressure valve-gear radius-bar trunnion bolt worked out of position and fouled valve-gear connecting rod; nut, washer and cotter key missing from trunnion bolt and threads on bolt badly worn; one injured.

\*\*May 15, 1936, locomotive 1407, Marion, Va. Reversing gear or valve gear caught and then released suddenly, causing the reversing hand wheel to spin

rapidly; one injured.

\*\*June 6, 1936, locomotive 2004, Vulcan, W. Va. Reversing gear or valve gear caught and then released suddenly, causing the reversing hand wheel to spin rapidly; "Clean and oil air reverse cylinder, reverse hangs and hard to reverse" was reported at end of previous trip; one injured.

Six accidents; six injured.

#### NORTHERN PACIFIC RAILWAY:

\*\*July 16, 1935, locomotive 1748, Yakima, Wash. Check valve in blower fitting leaking; 1 injured.

\*\*July 21, 1935, locomotive 1838, Furlong, Mont. Trailer-truck-wheel tire

came off; one injured.

\*\*September 15, 1935, locomotive 2606, Jamestown, N. Dak. Classification lamp difficult to reach account of being 6 feet 2 inches above step; one injured. October 18, 1935, locomotive 1550, Mandan, N. Dak. Ashpan-door hinges broke off through fusion welds securing them to ashpan door, permitting door to

fall on employee's foot; one injured.
October 28, 1935, locomotive 1386, Attalia, Wash. Reverse gear difficult to operate, caused by eccentric strap blades being slightly cocked; one injured.

\*\*November 23, 1935, locomotive 2385, Gary, Minn. Water glass burst. breaking glass panels in water-glass shield; one injured.

\*\*November 29, 1935, locomotive 1839, Benz, Mont. Hook broke off water-

spout rod: one injured.

\*\*December 18, 1935, locomotive 2610, Martin, Wash. Fire rake fell from the top of coping on tender; notches in device for holding fire rake not deep

enough to safely secure the rake; one injured.

March 4, 1936, locomotive 5010, near New Salem, N. Dak. Water glass burst, breaking guard glasses; insufficient clearance between sheet-iron extension-rod bracket plate and upper water-glass fitting, permitting fitting to receive vibration from the plate; new water glasses applied on February 10, 20, and March 3; one injured.

May 12, 1936, locomotive 253, Morris, Minn. Fire hook became dislodged from its position on tender and fell out of gangway, striking employee; one injured.

Ten accidents: 10 injured.

#### PENNSYLVANIA RAILROAD:

August 18, 1935, locomotive 389, Philadelphia, Pa. Steam-heat starting valve leaked after being closed; sleeve very loose and improperly applied. Employee contacted high-voltage trolley line when he went out on boiler, apparently to trace out the pipe line and assure himself that the proper valve had been closed as the operating wheel in cab was not marked for identification; one killed.

August 29, 1935, locomotive 3094, Enola, Pa. Employee's grip on cab-roof handhold was broken when it came in contact with a cab-window awning rod which fouled the handhold, causing him to fall from the locomotive; awning rod had become disconnected at its front end and had been hooked up over the cab-

roof handhold: one injured.

November 17, 1935, locomotive 6750, near Port Deposit, Md. Ashpan-operating lever broke off shaft, due to defective weld, permitting ashpan slides to open, and ashpan rigging fouled on track, then some part struck and broke brake pipe which caused emergency application of the brakes. Apparently ashpan slides were applied backward which permitted them to extend below the rails when in open position; one injured.

December 11, 1935, locomotive 4508, Hanlin, Pa. Fire tube failed at defective

safe-end weld; one injured.

December 30, 1935, locomotive 3471, Glynden, Pa. Crank pin came out of the hole in main-driving-wheel hub due to having been improperly applied; crank pin was three-sixty-fourths inch smaller than hole in wheel hub; one injured.

February 13, 1936, locomotive 7769, Fort Wayne, Ind. Firebox side sheet pulled from 55 stay bolts, caused by overheating due to heavy deposits of scale

and mud on sheet and stay bolts: two injured.

February 20, 1936, locomotive 4571, Woodville, Ohio. Driving-wheel tire failed causing derailment of locomotive and part of the train; old flaw or crack

in tire; one killed.

April 9, 1936, locomotive 6879, Smithville, Ohio. Crown sheet failure caused by overheating due to low water; starting of exhaust-steam injector with live steam was unreliable due to live-steam relay valve being loose on valve stem account of threads worn; injector reported on March 31 and April 6 and 7; two

May 4, 1936, locomotive 4312, Black Run, Ohio. Front ashpan door and part of operating rigging dropped on track and some of the flying parts struck and parted air hose between engine and tender, setting the brakes in emergency;

\*\*May 21, 1936, locomotive 3846, Lewistown, Pa. Burned by hot water which spurted from steam-heat line connection at rear of tender; steam-heat end valve leaking and the metallic flexible coupling formed a trap where the leakage accumulated until trap became full and the hot water was ejected; one injured.

May 30, 1936, locomotive 6913, near Thompsontown, Pa. Train separated between tender and first car of train, causing undesired emergency application of the brakes: one injured.

Eleven accidents: two killed, eleven injured.

#### PERE MARQUETTE RAILWAY:

\*\*January 17, 1936, locomotive 323, Port Huron, Mich. Arm rest pulled from cab-window sill causing employee to fall to enginehouse floor; arm rest insecurely fastened; one injured.

One accident: one injured.

#### READING COMPANY:

September 22, 1935, locomotive 204, Reading, Pa. Washout plug blew out; threads on plug and in plug hole in barrel sheet defective; plug heavily shouldered with graphite. Locomotive had just received monthly inspection and repairs: however, it was evident from the condition of the washout plugs that they did not receive proper inspection at this time; two injured.

November 30, 1935, locomotive 1606, Shamokin, Pa. Crown sheet failure

caused by overheating due to low water; two killed.

December 14, 1935, locomotive 1701, Tamaqua, Pa. Fell from locomotive while attempting to locate the source of a sand leak; action of the sand had cut through wall and threads of sander-pipe nipple and had worn a hole in the Y pipe fitting: one injured.

\*April 24, 1936, locomotive 2030, Birdsboro, Pa. Fell from running board

while attempting to adjust blower valve; one injured.

Four accidents; two killed, four injured.

#### RICHMOND, FREDERICKSBURG & POTOMAC RAILROAD:

June 27, 1936, locomotive 44, Potomac Yard, Va. Water-glass gasket blew out; bolts supporting glass became loose; one injured. One accident; one injured.

#### ROSCOE, SNYDER & PACIFIC RAILWAY:

\*\*September 26, 1935, locomotive 2, Roscoe, Tex. Radial stay blew out: attempted to tighten while under steam pressure; old fracture covered 75 percent of cross-sectional area of bolt; one injured.

One accident: one injured.

#### RUTLAND RAILROAD:

January 27, 1936, locomotive 63, Leicester Junction, Vt. Water glass burst: one injured.

\*\*April 3, 1936, locomotive 54, Rutland, Vt. Water glass burst, breaking.

guard glasses; one injured.

Two accidents; two injured.

#### ST. LOUIS-SAN FRANCISCO RAILWAY:

\*November 15, 1935, locomotive 830, West Tulsa, Okla. Pilot beam pulled off; one injured.

February 19, 1936, locomotive 1270, Kansas City, Mo. Boiler check valve stuck open after injector was operated; tolerance of fit of valve guide wings in sleeve was insufficient and valve wings stuck in sleeve, holding valve away from seat; one injured.

June 6, 1936, locomotive 4020, Parsons, Kans. Air bell ringer inoperative due-

to improper adjustment; bell rope defective; one injured.

Three accidents: three injured.

#### ST. LOUIS SOUTHWESTERN RAILWAY:

July 28, 1935, locomotive 782, Illmo, Mo. Water glass burst; one injured. One accident; one injured.

#### SEABOARD AIR LINE RAILWAY:

\*\*November 7, 1935, locomotive 321, Wildwood, Fla. Sand pipe stopped up:

"Clean out sander" was reported on November 6; one injured.

January 3, 1936, locomotive 203, Cross Hill, S. C. Bottom rod of tender brake rigging came down and was hurled against switch stand by movement of train, demolishing switch stand and freeing switch points which resulted in derailment of the rear of the train; apparently bottom rod pins lost out due to cotter keys missing or improperly applied; one injured.

March 6, 1936, locomotive 328, Big Indian, Fla. Grate shaker bar slipped off

post; grates very hard to operate account of fouling each other; one injured.

\*\*April 23, 1936, locomotive 259, Raleigh, N. C. Stepped into grate shaker bar hole in cab deck; shaker bar holes improperly located; one injured. Four accidents; four injured.

#### SOUTHERN RAILWAY:

\*\*August 25, 1935, locomotive 1403, Spartanburg, S. C. Burned by hot grease while removing grease-cup plug from wrist pin account of main rod bearing running hot; bearing keyed up too tight; one injured.

\*\*September 6, 1935, locomotive 3841, Selma, Ala. Front end of right main rod broke through old fracture at key way; "RFMR key loose" was reported

on August 5, 29, September 3, and 5. While changing engines on this train, employee was injured while attempting to reverse the locomotive which was on one side; one injured.

October 2, 1935, locomotive 4630, near Shellmound, Tenn. Vertical cab handhold at gangway broke near the top, causing employee to fall to the ground: old fracture through top end which had been flattened and bent for bolting to cab

corner post; one injured.

November 26, 1935, locomotive 6922, Meridian, Miss. Engineer fell while returning from top of tank after springing top cab curtain rod in an attempt to prevent curtain from working open; no catch or other provision for holding the curtain closed; one injured.

December 11, 1935, locomotive 5073, Buena Vista, N. C. Pilot sill step broke off, causing employee to fall from locomotive going 20 to 25 miles per hour; step bracket failed due to old defect at lower bolt hole at pilot beam and brace broke at its lower end; pilot step reported loose twice on December 7; one injured.

\*\*December 14, 1935, locomotive 599, Canton, N. C. Safety hanger of left

main driving brake beam broke; one injured.

February 14, 1936, locomotive 1710, East St. Louis, Ill. Reverse gear difficult to operate due to lack of lubrication, caused by oil furnished being too heavy to flow; reverse gear reported on February 13, 14, and 15; one injured.

April 29, 1936, locomotive 4831, McDonough, Ga. Burned by hot water and steam escaping from ashpan blower pipe; plug in T connection of ashpan

blower missing; one injured.

\*May 27, 1936, locomotive 751, Duncan Tunnel, Ind. Due to an undetermined cause, automatic brake applying device designed to be actuated by displacement of truck applied the brake, resulting in train being stalled in tunnel for 45 minutes: one injured.

\*June 20, 1936, locomotive 5079, Barber, N. C. Crank pin very hot, causing

applied grease to explode and burn employee; one injured.

June 25, 1936, locomotive 1668, Richmond, Va. Fire hose burst; hose de-

fective: one injured.

June 29, 1936, locomotive 6293, Ludlow, Ky. Tender cistern manhole cover handle broke off, causing employee to fall from top of tank; old fractures at both ends of handle; one injured.

Twelve accidents; 12 injured.

#### SOUTHERN PACIFIC-LINES EAST:

June 27, 1936, locomotive (T. & N. O.) 162, Houston, Tex. Water glass burst: one injured.

One accident; one injured.

#### SOUTHERN PACIFIC—LINES WEST:

July 1, 1935, locomotive 3717, North, N. Mex. Conveyor chain of mechanical stoker broke and fouled in conveyor trough, causing stoker to stop; links of chain badly worn at point of failure; one injured.

July 5, 1935, locomotive 2943, Albany, Oreg. Blower valve bonnet blew out; bonnet loose in threads of valve body and bonnet seat damaged, allowing the

bonnet to be screwed out when valve was opened; one injured.

\*July 19, 1935, locomotive 3314, Wellton, Ariz. Air hose blew off tender; fabric of hose deteriorated, allowing upper connection to pull out; one injured.
\*July 31, 1935, locomotive 2792, Mikon, Calif. Insufficient clearance between

reverse lever and boiler back head and foot plate attached thereto; one injured. \*\*August 8, 1935, locomotive 2835, Overland, Oreg. Whistle rope became untied from whistle lever, permitting employee's arm to strike on cab window

sill; one injured.

August 15, 1935, locomotive 3695, Vevay, N. Mex. Flue burst at safe end weld; overheated in welding; one injured.

\*\*September 15, 1935, locomotive 4029, Cascade Summit, Oreg. Undesired emergency application of the brakes, caused by defective vent valve on locomotive: one injured.

\*May 26, 1936, locomotive 3678, Red House, Nev. Emergency application of brakes, caused by pipe connection to distributing valve on locomotive breaking;

one injured.

June 13, 1936, locomotive 3658, Mount Hebron, Calif. Vertical shaft supporting brakeman's cab seat was lifted out of bottom bracket when attempting to lower the seat from elevated storage position and shaft then slipped through seat frame strap hinges and fell to cab floor, striking employee's foot; shaft not properly secured in brackets; one injured.

June 28, 1936, locomotive 3269, Santa Margarita, Calif. Step missing from left back corner of tender; step had been removed by roundhouse force at San Luis Obispo on the previous day; one injured. Ten accidents: 10 injured.

SPOKANE, PORTLAND & SEATTLE RAILWAY:

\*\*August 21, 1935, locomotive 350, Astoria, Oreg. Piston rod broke off inside of crosshead fit; old fracture extended half way through piston rod; one injured. One accident; one injured.

TENNESSEE, ALABAMA & GEORGIA RAILROAD:

\*June 14, 1936, locomotive 302, Pigeon Mountain, Ga. Mechanically operated fire door inoperative; valve stuck; one injured. One accident; one injured.

TEXAS & PACIFIC RAILWAY:

\*July 11, 1935, locomotive 615, Baird, Tex. Insufficient clearance between blow-off cock lever and booster latch; one injured.

September 8, 1935, locomotive 668, Dallas, Tex. Water glass burst; one injured. \*\*May 30, 1936, locomotive 307, Fouke, Ark. While attempting to hook reverse lever up, the lever jerked forward causing injury to the employee; boiler foaming; one injured.

Three accidents; three injured.

Union Pacific Railroad:

December 30, 1935, locomotive 352, Kansas City, Kans. Rung in gangway ladder gave way; old fracture at ladder upright; one injured.

January 15, 1936, locomotive (O. W. R. & N.) 3210, near Hooper, Wash. Insufficient clearance between reverse lever and piping to straight air reducing

valve; one injured.

\*\*February 8, 1936, locomotive 2243, Cheyenne, Wyo. Tank hose burst near connection to right feed pipe; hose defective and inner layers appeared to have been burned; right boiler check reported on January 22 (two times), 23, 24 (three times), 25 (two times), 26, 27 (two times), 28, 30, February 2, 6, and 7: one injured.

Three accidents; three injured.

WABASH RAILWAY:

August 29, 1935, locomotive 2803, near Brunswick, Mo. Prong of hook being used in adjusting conveyor slide in bottom of coal bunker straightened out, allow-

ing the hook to slip out of hole in slide; one injured.

December 3, 1935, locomotive 2801, North Kansas City, Mo. Feed water heater pump throttle valve bonnet blew out of valve body, due to improper fit: bonnet too small for fit and had 16 threads per inch while valve body had 14

threads per inch; one injured.

December 7, 1935, locomotive 2901, Peru, Ind. Carrier iron hanger at rear of tender broke, permitting coupler head to lower and locomotive to separate from the train, resulting in undesired emergency application of the brakes; old fracture at the base of the boss of hanger; two injured.

June 1, 1936, locomotive 2900, Lafayette, Ind. Bell rope became wrapped around bell crank and stopped the operation of bell by air bell ringer. Employee fell or was knocked from step along side of the cab when he went out to free the bell rope; one injured.

Four accidents; five injured.

WESTERN MARYLAND RAILWAY:

January 15, 1936, locomotive 708, Security, Md. Ashpan would not dump properly; ashpan not standard, and ashpan opening reduced from 14 inches to 10 inches due to bolts applied through slides to act as stops; one injured. One accident; one injured.

WESTERN PACIFIC RAILROAD:

August 27, 1935, locomotive 22, Quartz, Calif. Crown sheet failure caused by overheating due to low water; one injured.

March 20, 1936, locomotive 19, Silver Zone, Nev. Crown sheet failure caused by overheating due to low water; two killed, three injured.

March 25, 1936, locomotive 76, Gerlach, Nev. Reverse lever difficult to operate account of defective latching device; one injured.

May 29, 1936, locomotive 80, near Marysville, Calif. Steam-heat pipe coupling but became disconnected from regulating value in each; one killed, one injured.

nut became disconnected from regulating valve in cab; one killed, one injured.

Four accidents; three killed, six injured.

#### ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1936, BY ROADS

[A double star (\*\*) indicates accidents 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 accidents in sufficient time after they occurred to permit them to be properly investigated.]

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

November 20, 1935, unit 1-A, near Dilco, N. Mex. Fire occurred in engine room of Diesel-electric locomotive unit caused by overflow from fuel reservoir vent pipes which discharged into engine room; one injured.

One accident; one injured.

#### CHICAGO & NORTH WESTERN RAILWAY:

\*\*January 18, 1936, unit 9905, Leigh, Nebr. Fire occurred at rear of engine room caused by flooding of the carburetor. Engine hot and idling too fast due to accumulation of ice and snow on throttle rigging which prevented closing the throttle: operator's cab not properly weatherproofed and there was about one inch of water on the cab floor, some of which passed down along throttle lever shaft where it froze and part of throttle rigging was located underneath the cab floor where it had no protection from ice and snow; one injured.

April 4, 1936, unit 9929, Mason City, Iowa. Fire occurred in engine room of gas-electric unit caused by ignition of gasoline overflowing from carburetors and vent pipe into engine room while refueling; gage on gasoline tank on left side of unit, the side next to fueling station, was inoperative; yent pipe discharged on

cab roof: one injured.

Two accidents; two injured.

#### ERIE RAILROAD:

February 19, 1936, unit 5006, Thiells, N. Y. Main reservoir supply pipe to automatic control valve broken off at the main air reservoir connection; one injured.

One accident: one injured.

#### GREAT NORTHERN RAILWAY:

\*\*June 25, 1936, unit 2316, LaBolt, S. Dak. Gasoline engine overheated due to overloading in hot weather; employee burned by steam and boiling water from cooling system when he removed radiator cap to refill the radiator; one

One accident; one injured.

#### NEW YORK CENTRAL—LINES WEST:

October 5, 1935, unit M-209, Lily Dale, N. Y. Exhaust valve stuck open; injured while attempting to seat valve while engine was running; one injured. One accident; one injured.

#### NORFOLK & WESTERN RAILWAY:

\*\*August 30, 1935, unit 18, Coaldale Tunnel, W. Va. Coupler knuckle failed through pin hole section, causing emergency application of the brakes: old fracture extended 20 percent through cross-sectional area at point of failure; one injured.

One accident; one injured.

#### PENNSYLVANIA RAILROAD:

October 9, 1935, unit 4713, Potomac Yard, Va. Drop-type cab window fell on employee's hand; screw missing from rubber stop bracket on bottom of window which allowed bracket to work out of position and this had bent and scored the aluminum vertical sill preventing locking rim on bottom of sash from engaging the vertical sill to secure the sash in place; aluminum retaining or locking ledges easily bent; one injured.

One accident; one injured.

#### UNION PACIFIC RAILROAD:

June 14, 1936, unit M-13, Willard, Utah. Gasoline-distillate unit was destroyed by fire which broke out under partition separating engine and baggage compartments: one injured.

One accident; one injured.

Table XII.—Number of steam locomotives

		( pa	L.	1	1	1	1 14		1.65	i	1	l m	1 70 1
	Parts defective, inoperative or missing, or in violation of the rules	Akron, Canton & Youngstown	Alaba	Aliquippa & Southern		Ann Arbor	Atchison, Topeka &	Atlanta & West Point	Atlanta, Birmingham &	Atlantic & Yadkin	Atlantic Coast Line	Baltimore & Obio, lines	Baltimore & Ohio, lines west
1	Air compressors Arch tubes Ash pans and mechanism Axles Blow-off cocks Boiler checks 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 Dratt gear Draw gear Draw gear Driving boxes, shoes, wedges, pedestals, and braces Firebox sheets Firebox sheets	1		,	ı		34				15	12	7
	Arch tubes				ĩ		3				1 1		
3	Ashpans and mechanism											4	1
4	Rlow off nooks		;				1					6	3
5 6	Boiler checks		1		3		13				2	7	4
6	Boiler shell						12	l	1	l	3	17	4 3 57
8	Brake equipment			1	2		75	1	1 1		54 18	116	57
9 10	Cab aprons and decks				3		7		2	- <del>-</del> -	8	49 16	22
ii	Cab cards						i	l			4		6 1 1
12	Coupling and uncoupling devices						1	:			1		1
13 14	Crown bolts				2	1	22 2	1			26		16
15	Cylinders, saddles, and steam chests				3		24	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<u>-</u> 9		40		23
16	Cylinder cocks and rigging						10	1	9		10	11	10
17	Domes and dome caps						2 7		;		1 8	5 11	1
18 19	Draw gear			_	2		4		3		14		6
20	Driving boxes, shoes, wedges, pedestals, and				-		-		ľ				- 1
]	braces				3		42		7		60	79	16
21 22	Flues				1		11 12		<u>-</u>		5 2	6 6	4
23	Frames, tail pieces, and braces, locomotive		5		1		19	<sub>ī</sub>	î	<u>-</u>	32	48	81
24	Frames, tender				1		5		1			4	1
25 26	Gages and gage fittings, air						8 16				1 15	17	5 10
27	Gage cocks	ī					35				32	19	8
28	Grate shakers and fire doors						11		l		4 8	10	10
29 30	Handholds			2			9		2		8	10	10
31	braces Firebox sheets Flues Frames, tail pieces, and braces, locomotive Frames, tender Gages and gage fittings, air Gage cocks Grate shakers and fire doors Handholds Injectors, inoperative Injectors and connections Inspections and tests not made as required Lateral motion Lights, cab and classification		2		4		73		<u>-</u> 6	 1	89	1 55	24
32	Inspections and tests not made as required	1	8	5	26	1	339	<u>-</u> 8	18	1	299	294	119
33 <b>3</b> 4	Lights coh and elessification						6				5 1	10	3 1
35	Lights, headlight			ī			13					3 6	1
36	Lubricators and shields						9				9	9	4
37 38	Mud rings						18 37			1	8 4 27 3	11 10	1 4 4 5
39	Packing, piston rod, and valve stem				4		4	ī	5		27	40	9
40	Pilot and pilot beams						4				3	7	9
41 42	Plugs and studs				1		19		;		4	19	.4
43	Rods, main and side, crank nins, and collars	2			1		$\frac{12}{32}$		1		47	34 99	14 24
44	Safety valves						3				3	5	2
45	Sanders			1			20			1	3 7	15	13
46	Lateral motion.  Lights, eab and classification.  Lights, headlight.  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.  Springs and spring rigging.  Squirt hose.  Stay bolts.  Stay bolts.  Stay bolts, broken.  Steam pipes.  Steam valves.  Steps.	- <del>-</del>		5	1		53 17	2	11	2	67	147 1	33 1
48	Stay bolts						19				2 2 33	12	3
49	Stay bolts, broken		2				;:	1			33	22	
50 51	Steam valvas						15 1		2		30	24 5	5 6
52	Steam valves. Steps. Tanks and tank valves. Telltale holes. Throttle and throttle rigging. Trucks, engine and trailing. Trucks, tender. Valve motion. Washout plugs. Train-control equipment		į				15				1 2 9	16	3
53	Tanks and tank valves			1	3		28				9	53	16
54 55	Throttle and throttle rigging			1			97				10	2 11	6
56	Trucks, engine and trailing						22		1		10	44	9
57	Trucks, tender				1		22		1 2 4		10	37	9
58 59	Washout plugs		1		2		30		4		22 15	52 14	10 4
60	train control equipments										10	2	*
61	Water glasses, fittings, and shields				ī		38	1	1		9	42	10
62	Wheels		3				16		1		33	41	6
ا ت	plates, brakes (hand)				2	1	26				14	23	13
	· · · · · ·					_				<u> </u>			——
	Number of defects	5	26	20	85	4	1, 384	25	82	6	1, 155	1, 769	600
1	Locomotives reported	22	15	19	185	47	1, 779	51	80	14	766	2, 272	
ŀ	Locomotives inspected Locomotives defective	67	16	34	413	111	1, 779 3, 259	65	158	29	1, 491 317	2, 933	1, 988
Į	Percentage of inspected found defective	2.9	50	5 15	28 7	.9	404 12	12	23 15 2	2 7	21	372 13	155 8
Į	Locomotives ordered out of service		4		i		8		2		27	37	Ď
	No. of the second secon	_						<u>_</u>					

inspected, found defective, and ordered from service, etc.

Bangor & Arosstook Belt Ry. of Chicago	Bessemer & Lake Erie	Desserrier of trave tring	Birmingham Southern	Boston & Albany	Boston & Maine	Buffalo Creek	Burlington-Rock Island	Camas Prairie	Canadian National	Canadian Pacific	Carolina & Northwest- ern	Central of Georgia	Central R. R. of New Jersey	Central Vermont	Charleston & Western Carolina	Chesapeake & Ohio	Chicago & Eastern Illi- nois	Chicago & Illinois Mid- land	Chicago & Northwest- ern	Chicago & Western In- diana	Chicago, Burlington & Quincy	Chicago Great Western
1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	71331	1 1 1 2 5 2 1 1 3 3 7 20 2 9		1 8 3 1 1 1 2 30 1 1 1 2 30	88		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 2 5 1 1 1 1 1 1 1 1 1 1 2 8 8	1 1 2 1 2 1 1 1 5 5 1 1 6 6 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 5 5 1 4 1 1 1 1 1 1 1 1 3 2 5 2 1 1 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2	51 17 46 63 31 11 13 3 15 7 9 22 12 12 12 12 12 12 12 12 12 12 12 12	4 4 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 3 2 1 1 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	2 2 3 4 4 5 5 5 5 6 5 6 6 6 6 6 6 6 6 6 6 6 6	55 2 2 4 4 4 199 188 1 2 2 7 7 7 5 3 3 8 1 1 2 2 6 6 1 1 1 1 1 1 2 2 6 6 2 6 6 6 6			300	1 3  1	5 1 1 3 3 4 2 5 5 1 4 2 2 2 3 1 3 6 6 4 4 3 3 2 7 7 5 7 0 6 6 6 6 6 6 6 6 4 4 5 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1 91
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23 8 74 8 119 5 11 1	6 1	107 124 182 23 13	21 21	75 230 406 34 8	688 1, 165	17 21 21 10	17 137 2 5	15 62 19	151 36	135	10	412	201 418 1, 017	64	32	837 1, 933	400	21 50	1 17	52 20 36 12 33	760 1, 044 2, 811	640 165

Table	XII.—Nu	nber of	steam	locomotives	inspected,
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	Parts defective, inoperative or missing, or in violation of the rules	Chicago, Indianapolis &	.	.	_	Chicago, St. Paul, Min-	Chicago Short Line	Chicago, West Pullman	Cincinnati Union Ter-	Cleveland, Cincinnati,	linchfleld				Conemaugh & Black	LINE
1	Air compressors		1 1	3	_ 2	1	3	_	-		2	4	8	_ _	-	-1
2	Arch tubes	.1	.		_		1	_		1	1	٦	-1	7 77	-	-1
3	Ashpans and mechanism	<sub>j</sub>	1	2		81	-	-1	-			i	ī	-1	-	-1
4	Ashpans and mechanism	. 1	7 :			'	-	-	-	-	1		4	-1	-	-1
	Dlam ofla	1:	: :	<u> </u>			-	-				-!	-		-1	-I.
5	Blow-off cocks Boiler checks	.  1	4 3	3	- 1	7	1	-1	-	-  4	Ц.	1	-	-1	.	-1
6	Pollet checks		.] }	5]	1 1	ų	1	-	-	.  {	5		-	_	11	-1
7	Boiler shell		- 1	/ ·	_ 10	)] :	21	-1	_		.					i.
8	Brake equipment	.  {	49	) :	1 93	3 1	6	_!	_1	.16	14	4	9	1	4	7
9	Cabs, cab windows, and curtains	.  8	<b>3</b> 41		1 80	) 1	2	_1 `	2	10	2	1 2	8			1
10	Cab aprons and decks	2	8 6	: :	1 20	1 -	2	īl	7	1 2	,  –		ĭ	-	-	-1:
ĨĨ	Cab cards	l i	1			íl i	ก็	1	2	1 1	1:	1		-		-1
12	Coupling and uncoupling devices				. 1	11		-	-		1 1	4	-	-	-	-  .
13	Crossheads, guides, pistons, and pis-	١ ،	1 .		-1 -	۱ <b></b> -		-	-	. 1		-	-	-		- J.
10	ton rode	2	20	J.		Ι.	ام	1	i	1 .	. ۔	٠.	.	1	.]	1
14	ton rods	1		1 '			٠	-	-	. 4	10	<u> 1</u>	4		i	-1
	Cylindore coddles and steem shorts				- 2		: :	:	-	. 1		LI	_1	_	1	-[,
15	Cylinders, saddles, and steam chests.	ا ا	32		. 70		5	<u></u>	-	. 12	23	3	9		2	J.
16	Cylinder cocks and rigging Domes and dome caps		t				8	5	-	. 1		կ ։	2[	-		.
17	Domes and dome caps								-	. 1			-			.[
18	Draft gear	3					7			1 2	3		2	-		ď
19	Draw gear	3	9		.   25	1 4	5 2	2 3	2	.  1	2	3	-	.  2		ı.
20	Driving boxes, shoes, wedges, pedes- tals, and braces			1	1 -	J		1	1	1	1	1	ł	1	1	ľ
1	tais, and braces	11					£	-	-	17	8	) !	əl	.		.1.
21	Firebox sheets	2	2					-	.	2	2	:l	.l	.	. 1	di.
22	Flues	1			.  8			-l	. 1	1	1				1.	Τ'
23	Frames, tail pieces, and braces, loco-			1			1	1	1	l		1	1		1	T
- 1	motive Frames, tender	5	41		.] 35	8	5	-1	.	4	11	10	)		!	1
24	Frames, tender		2				2	-	.				tl		1	1
25	Gages and gage fittings, air		4				[	-	.	1	1				1	1
26	Gages and gage fittings, steam	ļ <u>-</u>	7		. 12		L	-1		1	2	1 1	7	i	1	T.
27 28	Gage cocks	3	5		. 13	- 3	3			5	9	1 3	3	. 1	1	ıl.
28	Gages and gage fittings, air	2	11		. 22					4			i	.		.[
29	Handholds.	3	11		. 13			-		1		1:	U	.	l	Ŀ
30	Handholds Injectors, inoperative Injectors and connections	=	1		. 3	1	l					١				ľ
31	Injectors and connections	2	32	1	70	12	3		.	15	10	22		. 1		t:
32	Inspections and tests not made as	63	150	١.	010		J	١.			١.	i	1	1		Ŀ
33	required'	03	156 3	4		70	/	-  1	·	92	44	55	5 8	3 1	1	Ľ.
34	Lights ash and classification	1	ı		42	1 1				2	6	١٤	1 1			1
25	Lateral motion Lights, cab and classification Lights, headlight				10											
35 36	Liphricatore and chiefde		3		18					1		i;				
37	Mud rings	<u>-</u>	4		6					1 3	2	4	J			
38	Packing nuts	7	4		15					ııı	3 1	1 4				ŀ
39	Packing, piston rod, and valve stem	7 2	25	ī	31					5	11	10		1		
40	Pilot and pilot beamsPlugs and studs	2	4		9					ľ	11	10				ŀ
41	Plugs and studs	1	7		12	3					ī	١ ،				ŀ
42	Reversing gear	2	4	<u>ī</u>	19	Š				4	3					ľ
43	rings and studs. Reversing gear Rods, main and side, crank pins, and collars. Safety valves. Sanders.					•	-	1		1	٠	' ا				l
1	collars	18	50		86	9		2		9	28	7	1	2	L_	
44	Salety valves		7		12							 	l <sup>-</sup>	آء۔		ľ
45	Sanders.	1	13	2	24	4				7						Ľ
46			65		124	18				11		17		3		ľ
47	Oten balts	1	1	1		2					1	1		l		
48	Star bolts broken	비	2		6	1				6	5			أـــــــــــــــــــــــــــــــــــــ		ľ.
49	Squirt hose Stay bolts. Stay bolts, broken Steam pipes		1		2	16						7		ابـــا		ľ.
50	Steem relyes		4		18	3	<del></del> -			4	1	1				Ĺ
51 52	Stane	1	14		17				[ <u> </u>	1	1					ľ
53	Tanks and tank volves	-	17	<u>-</u> 1		3				1	2	.4	ĩ	1		į.
54	Steam pipes Steam valves Steps Tanks and tank valves Telltale holes Throttle and throttle rigging		- 4	1	👊					2	6	11		1		1-
55	Throttle and throttle rigging	5	22	<u>î</u>	22	7								ا۔۔۔ا		i.
56	Trucks, engine and trailing	á	14	-	24	10				6		3 6		2		1
57	Trucks, engine and trailing Trucks, tender	10	9	8		17					Ď			4		
58	Valve motion	5	27	ا	38					5	,2	29				,
59	Washout plugs	"	3		19					11	14	11		2		
60	Train-control equipment		٦٩		- "					11	23	2				
61	Water glasses, fittings, and shields	5	7		37	10				14	5	ã	<u>2</u>		}	
62	Wheels	7	10		26	6				3	3	5	2			
63	Wheels Miscellaneous—Signal appliances,	1				۲				9	9	٥				
1	badge plates, brakes (hand)	3	13	1	26			l	ا ۔۔۔۔ا	6	6	3			- 1	
ı	Number of defects	227	857	26	1, 740	304	8					_	==		<del></del>	
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	Locomotives reported		1, 221	53	1, 260	276	10	11	13	642	86	$11\overline{3}$	21	26	30	
	Locomotives inspectedLocomotives defective		2, 878	30	2, 873	559	21	19		1, 164			24	46	11	
	Percentage of inspected found defec-	67	232	8	410	87	2	2	1	104	50	68	8	12	1	
- 1	tive	21	8	22	14	16	10	11		F 9	31	19	12	امم	ا۔	
	Locomotives ordered out of service	-6	ĭ		35	7			5	75	8	12	-4	26	9	

fou	nd e	defe	ctive	. a1	nd	ore	dere	ed fr	rom	ı ser	vi	ce,	etc.	C	onti	nued	l							_
Copper Range	Cumberland & Pennsyl-	Delaware & Hudson	Delaware, Lackawanna & Western	Denver & Rio Grande	Mestern Donner & Salt Lake			Detroit Torming				Duluth, Missabe & Northern	ore &	East Tennessee & West- ern North Carolina	ω Elgin, Joliet & Eastern	22 22 Eriô	Florida East Coast	Fort Smith & Western	For Work & Denver	ω Georgia & Florida	Georgia	Grand Trunk Western	Great Northern	1
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	Parts defective, inoperative or missing, or in violation of the rules	Green Bay & Western	Gulf Coast Lines	Colorado & Santa	North-	& Termi-	Broad	1		Solt		reat		no Momenta	Ī	ī	ansas Otty I er milital
1 2	Air compressors	-	-	-	1	1		- 1	26		-		_	ī	- -	1	-
2 3 4				-		-		- 1				-	-	-	· <b>-</b>	-	- 1
5	Axles Blow-off cocks Boiler chacks	-[	-		-	il		;	i <u>a</u>	· <b>-</b>	-	_l					
6 7	Boiler checks Boiler shell Brake equipment Cabs, cab windows, and curtains Cab aprons and decks	-  :	2	1	2	1	- 1		9		-	-	-	ī :-			
8	Brake equipment		2	1	D	J		4	18(			-	-	1	-	il:-	-
10	Cab aprons and decks		3 3	2	2	1		5	59		1		-1	7		-1	
11 12	Cab cards Coupling and uncoupling devices		-				J . <b>.</b> .		3	-	ī[	-	-	-			ī
13	Utussueaus, guides, histors, and his-	1	1	1	-	-	·-  <i>-</i>				-	-	-	-[	-	-	-
14	Crown bolts	.  ]			4	-	-		4		-		-	2	-	1	-
15 16	Cylinders, saddles, and steam chests Cylinder cocks and rigging			1	2			3	1				-	ī ::	-	2	
17	Domes and dome cans.				! 	-	-	_ 1	3	-	-	-	-	-		-	-
18 19	Draft gear Draw gear	1 9	)			1			5	_	-	-	-	- 1	-	-,	-
<b>2</b> 0	Driving Doxes, shoes, wedges, nedes,	1	1			1				-	-	-	1	-	-	-	-
21	tals, and bracesFirebox sheets			3	3	2		1 4		-	-			3	-  :	۱	-
22 23	Frames, tail pieces, and braces loca-		·			-	-	-	-					.		[:::	
24	Frames, tail pieces, and braces, loco- motive	1	. 1			2 :	2			_] :	ı			3	. :		_
25	Gages and gage fittings, air		1	1 3			-			-		·	i				-
26 27	Utages and page fittings steem	1	1 1			1		]] :	2	-1	l	·	.				
28 29	Gage cocks. Grate shakers and fire doors.	<u>-</u>		2			-	-	9						-   1		-
30	Handholds			2					7				.   8	i	.] ]		-
$\frac{31}{32}$	Injectors and connections Inspections and tests not made as re-	1		7	4	i	-	4									i
33		15	6	33	18		2 :	203	2		2	۽ ا	9	,	. 10	1	
34	quired			1				-  :	2	-					.]	.l	.]
35 36	Lights, headlightLubricators and shields				1			. 1 - 2	3	.				l			
37 38	Poolsing nusta				1				2					<b>-</b>			1
39	Packing, piston rod, and valve stem	2		2	6			- 1/	5	.	3				. 1	1	
40 41	Packing histon rod, and valve stem Pilot and pilot beams. Plugs and studs Reversing gear.	1		1	1			. ]	)						1		
42 43	Reversing gear			3	<u>î</u>			. 8		<u>ī</u>		1 2			1		
	Reversing gear Rods, main and side, crank pins, and collars		1	14		1			3 	1			6	1			1
44 45	Sandara							.  8	(J								
46 47	Squirt have	7	2	10	16			93		2		2	<u>-</u> 5		3		[
48 49	Stay bolts, broken				$\begin{vmatrix} 2\\1 \end{vmatrix}$		1 1	1 3		2							]
50	Steam pipes				- <b>-</b>							2					
51   52	Steam pipes. Steam valves Steps.			٠				6							1 2		
53 5 <b>4</b>	Tanks and tank valves			5 5	1	l		.1 16				<sub>î</sub>	1 2		1		l
55	Throttle and throttle rigging	1		3	<u>-</u>			1 19	J						2		
56 57	Trucks, engine and trailing Trucks, tender			11			1	36				<u>-</u> 1	2		1		İ
58 59	Valve motion	9	ī	5 20	<u>-</u> 1			31 17				1	<sub>1</sub>		ì		
60	Washout plugs Train-control equipment			5	2			5		2					ĩ		
61 62	Water glasses Strings and Linia	ī		2	1			26							<u>-</u> 2		ĺ
63	Wheels dasses, fittings, and shields.  Miscellaneous—Signal appliances, badge plates, brakes (hand).  Number of defects		1	3	1			13				1	1				
	Number of defects	70	$\frac{1}{22}$	3 191	78			17						<u></u>	_1		
	Locomotives reported	30	69	(1)	$\frac{-78}{77}$	$=\frac{5}{10}$		1, 109 1, 519	===	12 118	5 11	$\frac{18}{153}$	$\frac{62}{11}$		49	3	
	Locomotives defective		238 9	494	196	73	31	3,400	32	117	23	288	47		143 320	29 21	
- [	tive	- 1	ı	50	32	2	4	l ,		4	2	8	12		12	1	
$\perp$	Locomotives ordered out of service	17	0. 0	10 1	16 3	2.7	13	9 16		3.4	9	2.8	26		3.8	4.8	

four	rd d	lefe	ctiv	e, ar	ıd o	rd	ered	fro	m s	erv	ice,	etc		-Co	nti	nue			<del>-, -</del>			100	1 . 1	_
Oklahoma & Gulf	& Indiana	tern	Lake Superior & Ishpe- ming		Lake Terminal	Lehigh & Hudson River	Lehigh & New England	Lehigh Valley	Long Island	Los Angeles & Salt Lake	Tonisiana & Arkansas		siana Arkansas &	Texas	Louisville & Nashville	McCloud River	Macon, Dublin & Sa-	Maine Central	Maryland & Pennsyl-	Michigan Central	Midland Valley	Minneapolis & St. Louis	Minneapolis, Northfield & Southern	
Kansas,	Kentucky	Lake	Lake	Lake	Lake	Lebig	Lehi		_	Los	Lon	Log	101	3	Lon	W K	-	W W	Man	Mig.	ĮŽ	Min	i W	1
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<sup>1</sup> Union Pacific.

Table XII.—Number of steam locomotives inspected,

Springs and spring rigging	-	· · · · · · · · · · · · · · · · · · ·												_		•
Arch tubes		Parts defective, inoperative or missing, or in violation of the rules	St. Paul	Dakota	Minnesota Transfer	Mississinni Central	Missouri & Arkansas	Missouri-Illinois	Missouri-Kansas-Texas	Missouri Pacific	Mobile & Ohio	Monongahela Connecting	Monongahela	Montour	Montpelier & Wells River	
Arch tubes	1	Air compressors			-	-	-		-	-		-	-	-	-[	-
Sample		And tubes	-  3	2		-		6	-1	.  '	7  3	3		.	.	
Section   Sect		Arch tubes		-		-	-				-					.f
Boiler checks.		Ashpans and mechanism			-  :	2	-1				-	.			.	.1
Boiler checks.		Plant off cooks			-	-					. 1	Ц	.	.		. [
Solier shell		Poiler checks	-  -	4	-	-	-		.  1		b		.			
Firebox sheets	7	Poiler shall	- ;					3				. 1	l  1	1		.
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Cab aprons and decks		Cobe cob mindows and austrian	؛. ا∙		1 1	니	_  1	2 :	l  3		) e	i	. 1	l		ŀ
10   Cab cards		Cab appear and dealer	. 13	3 3	치	-1	-   L	0			) I		. 1			
12   Coupling and uncoupling devices   1   Crossheds, guides, pistons, and piston rods.   2   2   7   5   2   1		Cab aprons and decks	.  {	) ]	Լ∱	-	-  1	2	. 1	1 :	21					l
13   Coupling and unconjung devices piston rods.   2   2   7   5   2   1   1   1   1   1   1   1   1   1		Counling and uncounling desires						1	·}	:	2					1:
14   Crown bolts.		Crossboods guides pistons and nistons and		:	·  <del>-</del>	-					-					ļ
13   Cylinders, saddles, and steam chests.		Crown bolts	1 2	4	-		-  :			7	7 5		1			L
10		Cylinders coddles and steem			-		-	_	.							Ľ
18   Draft gear.		Cylinder cocks and rigging					- 1:	2						l		Ι,
18   Draft gear.		Domes and dome care					-  :	2		] ]	l 3					1
19   Draw gear   1					: :		_									1
Driving boxes, shoes, wedges, pedestals, and		Draw goar	4		2		-  3	2		] ]	l  2					5
Draces   1		Driving hoves shoes wedges podestels and	1 0	1 1			-  -	I		] ]	IJ <b></b> -					
Pirebox sheets	20	brones boxes, shoes, wedges, pedestals, and	١.,	ŀ	1	1	Ι,		]	١		ĺ	ì	ļ		ĺ
Pines   Pine	21	Firehor sheets	1				-  }	<u> </u>						4		
Frames, tail pieces, and braces, locomotive   3   1   7   7   5   1   1   1   1   1   1   1   1   1		Fines					-  -				2					١.
Frames, tender	23	Frames, tail pieces, and braces, locomotive					٠ ;									
25   Gages and gage fittings, steam   3	24	Frames, tender	۰							7	5	1			1	l
26   Gages and gage fittings, steam	25	Gages and gage fittings, air	i					-						i		
Tarks and tank valves   Tark	26	Gages and gage fittings, steam	3		•			;							<b>-</b> -	١.
Grate shakers and fire doors	27	Gage cocks					1 5	?								
Handholds   Hand	28	Grate shakers and fire doors	1				1							9		
Injectors, inoperative   1		Handholds	!	2	~~-	1		:								
Inspections and tests not made as required   39   8   5   2   37   1   7   58   36   4   5   5   2   2   34   Lights, cab and classification   1   1   1   1   1   1   1   1   1		Injectors, inoperative		-	1		1 1	1	ŧ 1	U	1 2					
Inspections and tests not made as required   39   8   5   2   37   1   7   58   36   4   5   5   2   2   34   Lights, cab and classification   1   1   1   1   1   1   1   1   1		Injectors and connections	4		Ιî	3	17	,	9	16	12					
Lights, cab and classification.		inspections and tests not made as required	1 39	8	5	1 3	37		~	58	36	1	1 5			
Lights, cab and classification	33	Lateral motion				l	١,	^	l il	9	30	7	٥	9	2	١.
Lights, headlight		Lights, cab and classification							1 1	-				-		ľ
Authoristics and shields		Lights, headlight	1							1	1					
Nucl rings   Packing nuts		Lubricators and shields								ĩ						
Facking nuls.   3		Mud rings									1					
## Pilot and pilot beams   3		Packing nuts	3							4	1					
Prings and studs   Prings   Pring		Pilot and milet have	7													
Reversing gear		Pluge and stude	3			<b>-</b>	1			2	4					
Rods, main and side, crank pins, and collars		Reversing geor	;									2				
Sanders		Rods main and side grank nine and college	1				2		1	2	1					
Sanders		Safety valves	4				5		2	5		3	2	1		
Springs and spring rigging	45	Sanders									2					,
Squirt hose	46	Springs and spring rigging	12		i		15		5			:	;			
Stay bolts, broken	47	Squirt hose		ĵ		_ 1	**		9			4	1	Z		
Stay botts, broken		Stav bolts		1			<sup></sup> i			*	il					
Steam pipes		Stay holts, hroken	4	1						j	4					
Steps		Steam pipes									2					
Step		Steam valves	1				2			2						
Telltale holes.		Topks and topk walker	9											1		
Throttle and throttle rigging		Telltale holes	7				8		1	8	3	1		/		
Trigkes, tender		Throttle and throttle rigging						!						].		
Trigkes, tender		Trucks, engine and trailing	2				4		1	6	[	1			1	
Yalve motion   Yalv	57	Trucks, tender	- 1			;				11	5			[.		
Train-control equipment.   11	58	Valve motion	1			Ŧ			1	7		)-		-		
Train-control equipment	59	Washout blings	17	}			9		4					-		
Water glasses, fittings, and shields.	6 <b>0</b>	Train-control equipment	11							4	1		1].	-		
Wheels   W	61	Water glasses, fittings and shiplds	3	i					-			-	-	-		
Number of defects. 176 28 13 7 230 2 30 338 149 22 17 28 4  Locomotives reported. 324 10 20 19 15 18 356 1,003 175 30 53 19 12  Locomotives defective 55 9 5 2 45 1 13 80 64 4 5 5 2  Percentage of inspected found defective 8 45 12 7 60 2 3 1.5 3.6 14 22 3.7 13 6	32	Wheels								0				9.		
Number of defects. 176 28 13 7 230 2 30 338 149 22 17 28 4  Locomotives reported. 324 10 20 19 15 18 356 1,003 175 30 53 19 12  Locomotives defective 55 9 5 2 45 1 13 80 64 4 5 5 2  Percentage of inspected found defective 8 45 12 7 60 2 3 1.5 3.6 14 22 3.7 13 6	33	Miscellaneous—Signal appliances, badge	7				l ĭ		-		-	3	4	-		
Number of defects. 176 28 13 7 230 2 30 338 149 22 17 28 4 Locomotives reported 324 10 20 19 15 18 356 1,003 175 30 53 19 12 Locomotives inspected 771 20 43 30 75 44 862 2, 222 381 18 136 39 33 Locomotives defective 55 9 5 2 45 1 13 80 54 4 5 5 2 Percentage of inspected found defective 8 45 12 7 60 2.3 1.5 3.6 14 22 3.7 13 6	Į	plates, brakes (hand)	4		[		3			2	3		Ì			
Locomotives reported 324 10 20 19 15 18 366 1, 003 175 30 53 19 12 Locomotives inspected 7711 20 43 30 75 44 862 2, 222 381 18 136 39 33 Percentage of inspected found defective 55 9 5 2 45 1 13 80 54 4 5 5 2 Locomotives defective 8 45 12 7 60 2.3 1.5 3.6 9 14 22 3.7 13 6	- [			20	12											
Percentage of inspected found defective 55 9 5 2 45 11 13 80 54 4 5 5 2 Recomplied the property of the propert			170		13		230	_2	30	338	149	22	17	28	4	
Percentage of inspected found defective 55 9 5 2 45 11 13 80 54 4 5 5 2 Recomplied the property of the propert		Locomotives reported.	324	10	20	10	15	10	356	002	175	30	53	10	10	
Percentage of inspected found defective 55 9 5 2 45 11 13 80 54 4 5 5 2 Recomplied the property of the propert	- 1	Locomotives inspected						44	862	222	381				12	
Locomotives ordered out of services 12 7 60 2.3 1.5 3.6 14 22 3.7 13 6	- 1	LOCOMOLIVES DETECTIVE			5		45	1	13	80	54	4	5	5	9	
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		Documentes ordered out of service	<u></u> l	<u> l</u> .		<u></u>	_2			2		_2[		ĭl_		

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

Nashville, Chattanooga & St. Louis	Nevada Northern	Newburgh & South Shore	New Orleans Public Belt	New York Central, lines east	New York Central, lines west	New York, Chicago & St. Louis	New Lork, thew mayer & Hartford	1	Portons & Fortsmouth Belt Line	Norfolk & Western	Norfolk Southern	Northern Pacific	Northern Pacific Terminal	Northwestern Pacific	Oregon Short Line (6 months)	Oregon-Washington R. R. & Navigation (6 months	Patapsco & Back Rivers		Pennsylvania - Reading Seashore Lines	Peoria & Eastern	Peoria & Pekin Union	Pere Marquette
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Table XII .- Number of steam locomotives inspected,

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	Parts defective, inoperative or missing, or in violation of the rules	Phila.,	Pitts. & 1	Pitts. & Shawmut		Pittsburgh, Shaw-	Quebec Central	Reading Company	Richtmond, Freder-	Rio Grande South'n	River Terminal	Rutland	St. Johnsbury & Lake Champlain	St. Joseph & Grand Island (6 months)	St. Louis-San Fran-	St. L. Southwestern
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Air compressors. Arch tubes. Ashpans and mechanism Axles. Blow-off cocks. Boiler checks. Boiler checks. Boiler shell. Brake equipment. Cabs, cab windows, and curtains Cab aprons and decks. Coupling and uncoupling devices. Coupling and uncoupling devices. Crossheads, guides, pistons, and piston rods. Crown bolts. Cylinders, saddles, steam chests. Cylinder cocks and rigging. Domes and dome caps. Dratf gear. Draw gear. Draw gear. Driving boxes, shoes, wedges, pedestals, and braces.	5 4	3 4 2 1 2 1 1 1		113 2 4 4 1 1 2 2 1 3 2 2 2 2 2 2 2 2	1	1 1	30 23 30 2 35 7 7 5 4 13		1	2 3 3 2	1 2			14	3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
21 22 23 24 25 26 27 28 29 30 31	Fineox sneets. Files. Frames, tail pieces, and braces, locomotive. Frames, tender. Gages and gage fittings, air. Gages and gage fittings, steam. Gage cocks. Grate shakers and fire doors. Handholds. Injectors, inoperative.	1	1 2 1 4 1 1		3  1  1		1	155 5 119 4 197	10  1 1 1 1 2	1 1 3	1 2	1			3 2 2 2 4	2 6 6 2 3
33 34 35 36 37 38 39 40 41 42 43	Inspections and tests not made as required. Lateral motion Lights, cab and classification Lights, headlight Lubricators and shields Mud rings Packing, piston rod, valve stem Pilot and pilot beams. Plugs and studs. Reversing gear Rods, main and side, crank pins, and collars. Safety valves.	8	21  3  2 6	1	21 1 2  7	1	2	140 5 10 4 3 8 25 8 6	32	8  4 1  3 1	1	9  1  2	1		44  5 1	41  2 5 1 3
44 45 46	and collars. Safety valves. Sanders. Springs and spring rigging. Squirt hose. Stay bolts. Stay bolts, broken. Steam pipes. Steam valves. Steps. Tanks and tank valves. Telltale holes. Throttle and throttle rigging. Trucks, engine and trailing. Trucks, tender. Valve motion.	7	4		5	<sub>2</sub>		31 48	1 1 5  4 2 2 2	3	1 1 2 4	i .		1	10 12 3 1 4	8 13 1 3 1 2 5 9
60 61 62	Trucks, engine and trailing. Trucks, tender. Valve motion. Washout plugs. Train-control equipment. Water glasses, fittings, and shields. Wheels. Miscellaneous—Signal appliances, badge plates, brakes (hand). Number of defects. Locomotives reported.	1 1 43 26	7 4 1	5	1 4 6 2 7 3 162 32	16	6	8 1 13 4 9 826	2 1  7 3	1  2 63	16 1 52	1 26	1		3 · 1 1 2 1 2 166	
	Locomotives inspected Locomotives defective Percentage of inspected found defective Locomotives ordered out of service	99		24 27 1 . 7	32 69 23 33 10	32 35 5 14	2	726 1, 678 183 11 7	93 149 32 21 3	13 11 8 73 1	15 52 15 29 4	10	10 49 1 2	(2) 17 1 6	739 1, 497 56 3. 8	618 73

REPORT OF THE CHIEF INSPECTOR OF LOCOMOTIVES

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

	Savann'h & Atlanta	ne	;;  ;;		Pacific, ast	Southern Pacific, lines west	Southern Pacific of Mexico		at'1	Spokane, Portland & Seattle	St'lton & Highsp're	Tennessee, Alabama & Georgia	Tennessee Central	Coal,	. As-		ļ	Tex. PacMo. Pac. Term. of N. Orl'ns	,	8 8	B	Hamilton ıffalo
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14	44 5				4.6	13 14	60 3	14 78	7	17	1		31 3	33	36 11	4.8	7	20		1	1	67

Union Pacific.

Table XII .- Number of steam locomotives inspected,

	Parts defective, inoperative or missing, or in violation of the rules	Tremont & Gulf	Uintah	Union Pacific	Union	Upper Merion & Ply- mouth	Utah
1	Air compressors			15	1		
3	Arch tubes. Ashpans and mechanism. Axles.			2			
4 5	Axles.						
6	Boiler checks			6 9			
6 7	Boiler shell Brake equipment. Cabs, cab windows, and curtains. Cab aprons and decks.			4	2	1	
8	Brake equipment		<del></del>	41 31			
10	Cab aprons and decks			11		4	
$\frac{11}{12}$	Cab cards. Coupling and uncoupling devices. Crossheads, guides, pistons, and piston rods. Crown bolts. Cylinders, saddles, and steam chests.			3			
13 14	Crossheads, guides, pistons, and piston rods			64		3	
14 15	Crown bolts			2	1		
16	Cylinder cocks and rigging			50		$\frac{2}{2}$	
17	Cylinder, southers, and rigging.  Domes and dome caps.  Draft gear.  Draw gear.  Driving boxes, shoes, wedges, pedestals, and braces.  Firebox sheets.			2			
18 19	Drait gear			13		4	
20	Driving boxes, shoes, wedges, pedestals, and braces.			91			
21	Firebox sheets			3	1		
22 23 24	Flues Frames, tail pieces, and braces, locomotive Frames, tender Gages and gage fittings, air Gages and gage fittings, steam			44		<sub>i</sub>	
24	Frames, tender			2			
25 26	Gages and gage fittings, air			5 12	$\frac{2}{1}$		
	dage cocks			6		2	
00 1	Grate shakers and fire doors			8 15		3	
29 30	Injectors, inoperative			1			
31 32	Handholds. Injectors inoperative Injectors and connections Inspections and tests not made as required. Lateral motion Lights, cab and classification Lights, headlight Lubricators and shields Mud rings Decking nuts			40	1	4	
33	Lateral motion			184 15	2	26	
34 35	Lights, cab and classification						
36	Lubricators and shields			13			
37	Mud rings			1			
38 39	Packing nuts. Packing, piston rod, and valve stem. Plot and pilot beams. Plugs and studs.			28		3	
40	Pilot and pilot beams			8		2	
41 42	Plugs and studs			7.			
43   1	Reversing gear Rods, main and side, crank pins, and collars			67		6	
44   6	Salety valves.			2			
45   8 46   8	Sanders			17 98		6	
47	Springs and spring rigging  Quirt hose Stay bolts			1		2	1
48   8 49   8	Stay bolts broken			3	1		
50	stay bolts, broken steam pipes steam valves			15 5	. 2	5	
51   8	Steam valves			1			
$\begin{array}{c c} 52 & 53 \\ 53 & 7 \end{array}$	Fanks and tank valves			13 37		4	
54	Steps Fanks and tank valves Politale holes Phrottle and throttle rigging Prucks, engine and trailing Prucks, tender Valve motion			1			
55 7 56 7	rirottle and throttle rigging			10 33		6	
57 2	Frucks, tender			21		4	
58   Y	Valve motion			26		ŝ	
60	Vashout plugs. Frain-control equipment. Vater glasses, fittings, and shields.			10		1	
$\begin{array}{c c} 61 & V \\ 62 & V \end{array}$	Water glasses, fittings, and shields			23		12	
	Wheels			12 31	i		
	Number of defects			1, 180	15	112	
Ι,							_
1	cocomotives reported	10 12	10 19	1, 445 2, 173	153	11 72	16 36
Į	ocomotives defective.			277	3	26	
Ì	Percentage of inspected found defective			13 14	43 3 7 2	36 10	
				1		-"	

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

Virginian	Wabash	Washington Terminal	Western Maryland	Western Pacific	Wheeling & Lake Erie	Wichita Falls & South- ern	Winston-Salem South- bound	Wrightsville & Tennille	Roads with less than 10, and industrial loco-motives	Total defects
				2	3		1		87 21 7 3 13 44 41 348 214 64 66 25 66 2 158 59 10 97 84 113 35 37 70 0 18 29 49 49 49 49 49 49 49 49 49 49 49 49 49	740 74 79 79 13 236 3856 3853 3566 65 1, 638 450 1666 65 1, 0566 63 1, 717 70 114 513 451 1, 712 295 178 450 502 400 2, 085 9, 005 502 400 2, 085 9, 005 502 400 2, 085 9, 005 502 401 3, 178 256 678 3, 188 3, 008 1, 133 1, 178 2, 188 3, 188 3, 188 3, 188 3, 188 3, 188 4, 187 5, 187 760 861 1, 108 861 1, 108 861 1, 108 861 1, 108 861 1, 108 861
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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

	Pe	Percentage inspected defective								Ordered out of service							
Road	1936	1935	1931	1929	1927	1925	1923	1936	1935	1931	1929	1927	1925	1923			
Akron, Canton & Youngstown_Alabama, Tennessee & North-	2. 9	7	14	47	42	56	38	0	0	1	12	1		0			
ernAliquippa & SouthernAlton	50 15 7	39 0 1.3	28 0 0	37 31 3	56 26 14	53 69	78 0	4 0	0	3	0	2 0	1 0	0			
Ann Arbor Atehison, Topeka & Santa Fe Atlanta & West Point	12 12 12	2 15 10	0 8 4	9 14 6	25 24 9	35 71 32 23	75 97 49 27	1 0 8 0	0 0 14 0	0 9 0	3 0 14	5 2 40	9 15 30	29 24 84			
Atlanta, Birmingham & Coast 1 Atlantic & Yadkin Atlantic Coast Line	15 7 21	6 10 14	4.3 6 14	27 10 10	40 16 30	54 100	78 58	2 0 27	0 0 17	0	0 2 1 2	8	$\begin{array}{c} 4 \\ 12 \\ 0 \end{array}$	6			
Baltimore & Ohio, lines east 2 Baltimore & Ohio, lines west 2 Bangor & Aroostook	13 8 9	10 9 .9	4. 1 4. 7	15 17 31	30 49	35 52	62	37 5	20 10	7 3 8	10 17	32 72	113 113	45 153			
Bessemer & Lake Erie Birmingham Southern	31 13 0	27 11 17	4.3 12 0	35 22 14	43 54 21 100	28 51 63 0	50 66 <b>43</b>	0 1 3 0	0 1 3 1	1 0 1 0	1 4 6	3 5 1 0	1 4 1	6 6 <b>2</b>			
Boston & Albany Boston & Maine Buffalo Creek	8 11 10	11 15 9	15 13 0	16 16 0	26 23 18	47 36 0	54 67	0 6 0	0 13 0	6	0 3 0	0 13 0	10 23 0	7 191			
Burlington-Rock Island 4 Camas Prairie Canadian National 5 Canadian Pacific	14 31 24	45 53 32	9 47 37	18 16 34	41 50	61 <u>5</u> -	58 84	0 0 1	0 2 1	0 0 5	0 0 7	30	4 24	2 4			
Canadian Pacific Carolina & Northwestern Central of Georgia Central Railroad of New Jersey	18 12 19	12 16	25 -20	32 	44 30	56 37	76 33	1 2 8	<del>7</del>	2 10	5	10	0 8	5 <u>10</u>			
Central Vermont Charleston & Western Carolina Chesapeake & Ohio 6	6. 4 8 22	6 29	13 11 16	42 12 28	38 11 58	47 27 63	77 47 68	0 4 1	0 3 5 4	2 1 1	14 1 2	20 1 2	46 2 2	139 4 1			
Chicago & Eastern Illinois Chicago & Illinois Midland Chicago & Northwestern	7 22 0 17	6 15 0	9 12 0	17 28 14	28 38 83	49 64	68 75	$^{3}_{15}$	3	5 3 0	5 3 0	26 25 29	29 31	58 77			
Chicago, Burlington & Quincy Chicago Great Western	33 7 22	13 29 6 14	7 25 6 26	12 43 14 11	19 22 21 20	35 86 46 40	67 67 60 52	17 0 6 10	11 0 6	5 0 4 23	8 3 18 2	18 0 39 0	29 2 185 10	193 0 176 20			
ville Chicago, Milwaukee, St. Paul	21	21	11	26	29	45	57	6	3	1	2	14	7	13			
& Pacific Chicago River & Indiana Chicago, Rock Island & Pacific Chicago, St. Paul, Minneapolis	8 22 14	8 23 19	4. 5 0 11	9 5 17	13 0 29	27 70 55	48 62 76	1 0 35	2 1 44	2 0 17	5 0 13	9 0 49	12 5 124	58 0 367			
Chicago Short Line Chicago, West Pullman &	16 10	13 5	9	17 44	30 38	46	70 0	7	2 0	2	6	12 0	20	54 0			
Southern Cincinnati Union Terminal Cleveland, Cincinnati, Chicago	5	0	7	47	53	100		0	0		5	1	7	0			
& St. Louis 7. Clinchfield. Colorado & Southern Colorado & Wyoming. Columbus & Greenville.	9 31 19 12 26	8 30 22 56 19	6 9 8 0 17	24 38 43 21 25	34 25 40 27 21	76 76 15	67 68 81 14	5 12 0	7 14 11 2	3 1 2 0	16 5 10	37 0 4 3	47 1 52 2	77 10 71 0			
Conemaugh & Black Lick Copper Range Cumberland & Pennsylvania Delaware & Hudson	9 0 0 .5	12 12 1.3	16 18 12 2.7	58 28 29 2, 6	0 84 13	26 0 59 20 24	75 25 62	3 0 0 0	3 0 1 0	1 0 1 0	0 2 1 1 0	0 7 0 1	0 7 0 2	0 0 0 52			
Delaware, Lackawanna & West- ern	12 11	14 21	11 10	21 36	22 54	36 58	62 92	6	7	3	17 32	4 88	3 72	47			
Detroit & Mackinac Detroit & Toledo Shore Line Detroit & Toledo Shore Line Detroit Terminal	0 30 0	0 22 2, 8	0 41 0 18	19 33 8 31	36 33 46	68 82 51	93 26 78 76	0 0 0 1	0 1 0 1	0	0 0 1	88 7 0 1	72 39 2 5	174 8 0 3 0			
Detroit, Toledo & Ironton  Donora Southern  Duluth, Missabe & Northern	6 52 12	2. 6 17 1. 2 14	3.8 5 4.2 10	5 0 1 24	15 0 12 29	28 37 35	29 0 74 69	1 0 0	1 3 0 0	0	0 0 4	3 0 0 2	4 1 5	7 0 2 3			

1 Atlanta, Birmingham & Atlantic prior to 1927.
2 Includes Buffalo & Susquehanna and Buffalo, Rochester & Pittsburgh, 1933–36.
3 Statistics prior to 1927 included in Baltimore & Ohio east.
4 Trinity & Brazos Valley prior to 1931.
5 Includes Grand Trunk Western, 1925–27.
6 Includes former Hocking Valley, 1931–36.
7 Includes Peoria & Eastern prior to 1931.

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

East Tennessee & Western North Carolina  Fig. 1, Joliet & Eastern		Percentage inspected defective								Ordered out of service									
Shorth Carolina	Road	1936	1935	1931	1929	1927	1925	1923	1936	1935	1931	1929	1927	1925	1923				
North Carolina	Sest Tennessee & Western											١,	,	1					
	North Carolina							17		3		1 1		58					
Tries   Cord	unin Inliet & Eastern			12.7		19	30	70	21	17					100				
Tort Smith & Western										10									
Tort Smith & Western   10	lorida East Coast							87		ĭ					:				
See								27		8	2		3						
See	fort Worth & Denver Orty					55			9	3	5	2	2		1				
See	100mgin					12	34			3	0	3		2	2				
See	leand Trunk Westeru *									2	Ų	49		21	26				
See										1 6	9	1 42			20				
String   S	reen Bay & Western		17								โก้	Î							
Summer   S	Juli Coast Lines								Î	10		Ĭ							
String   S	Julf, Colorado & Santa Fe				22				3	6					ļ				
Mountain						1	i		ī	0	0	(							
MOUNTAIN   1	Tuntingdon & Broad Top		"		-									١.					
	Moliniain																		
Illinois Terminal	Ilinois Central II										22	14							
Indiana Hatrologic	'llinois Terminal						12				1 7	1 7	1 2						
Indianalons   Indianalons   Indianalons   International   Great Northern   28   5   7   42   60   83   94   78   2   1   1   1   0   11   9     International   Great Northern   26   17   42   60   83   94   78   2   1   1   1   4   6   6     Interstate   26   17   42   60   83   94   78   2   1   1   1   4   6   6     Interstate   26   17   42   60   83   94   78   2   1   1   1   4   6   6     Cacksonville Terminal   0   0   50   0   0   0   0   0   0     Cansas City Southern   3.8   7   1.9   7.9   26   52   92   0   1   0   0   0     Cansas City Terminal   4   8   12   0   24   24   80   88   0   0   0   0   0     Cansas, Oklahoma & Gulf   4   0   1.3   1   43   50   0   0   0   1   1     Cansas, Oklahoma & Gulf   4   0   1.3   1   43   50   0   0   0   1   1     Cansas, Oklahoma & Gulf   4   0   1.3   1   43   50   0   0   0   1   1     Cake Erie & Eastern   0   0   0   0   0   0   0   0   0	ndiana Harbor Belt		,.9									1 7							
International-Great Notation	ndianapolis Union		5	17											1				
Sansas City Southern       3.8       7       1.9       7.9       26       52       92       0       1       0       1       12       11         Kansas City Terminal       4       8       12       0       24       24       88       0       1       1       1       1       1       12       12       1       2       1       2       1 </td <td>nternational-Great Not thei h</td> <td></td> <td>17</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>3 2</td> <td>i i</td> <td>.] 1</td> <td>. 4</td> <td><b>1</b> €</td> <td></td> <td>i </td>	nternational-Great Not thei h		17						3 2	i i	.] 1	. 4	<b>1</b> €		i				
Xansas City Southern	nterstate				50	1 0			.] (	) (	) C	) (			<u>-</u> -				
Ransas, Oklahoma & Gulf.	Kansas City Southern	3.8	7	1.9	7. 9	26			2 9	) 1	. 0	) ]	12						
Kansas, Oklandilla & Grandilla	Zongog City Tormingi			0		24		88	3 3										
Rentucky & Indiana Terminal	Kansas, Oklahoma & Gulf			1.3	1	1	43		1 2					il á					
Lake Superior & Ishpeming 4.5 6 17 52 39 46 59 0 0 1 7 1 2 Lake Superior Terminal & Transfer 36 4.8 10 56 20 50 0 0 0 1 1 7 1 0 0 1 Leke Terminal 3.6 4.8 10 56 20 50 0 0 0 0 1 1 0 0 1 1 0 0 1 Lehigh & Hudson River 19 12 14 25 20 14 60 1 0 0 1 1 0 0 1 Lehigh & New England 11 12 12 21 26 65 70 2 1 0 4 2 5 Lehigh & New England 11 12 12 21 26 65 70 2 1 0 4 2 5 Lehigh Valley 5 6 10 39 26 36 71 2 2 8 42 14 26 Lehigh Valley 5 6 10 39 26 36 71 2 2 8 42 14 26 Lehigh Valley 5 6 10 39 26 36 71 2 2 8 42 14 26 Long Island 3.8 3.9 7 24 26 51 80 0 0 0 3 1 14 Los Angeles & Salt Lake 1 3.8 3.9 7 24 26 51 80 0 0 0 3 1 14 Los Angeles & Salt Lake 1 3.8 15 7 50 0 2 3 5 Louisiana & North West 16 48 17 50 36 75 0 1 0 4 2 Louisiana & North West 16 48 17 50 36 75 0 1 0 4 2 Louisiana, Arkansas & Texas 19 38 26 5 0 2 3 5 5 Louisiana, Arkansas & Texas 19 38 26 5 5 0 2 3 5	Kentucky & Indiana Terminai.				8	١,٠	ין י	"					1						
Lake Superior Terminal & 37   25   0   10   21   44   67   0   0   0   0   0   1	Lake Erie & Easteril				52	39	46	59					7 7	1	2				
Transfer	Lake Superior & Ishpelling	1 0	1	1.	02	"	Ί -`	1	1			l	1	1					
Lake Terminal	Transfer	37	25	0	10														
Lehigh & New England	Lake Terminal					20	50												
Long Island	Lehigh & Hudson River	19				20	14			: I	7 7	( )							
Long Island	Lehigh & New England	1 1		12					1 3	5 3	5	4							
Los Angeles & Salt Lake II		1							5 6	i (	5 6	) :	2 3	3	i  :				
Louisiana & Arkansas 3.2 3.8 15	Los Angeles & Salt Lake 12	3.8							) (	ol (	) (		3	l 14	!  3				
Louisiana, Arkansas & Texas   19   38   26   .	Louisiana & Arkansas	3. 2	3.8	15						) :	2 3	3	.]	:					
Louisville & Nashville	Louisiana & North West	. 16			50		. 30	6 7	5 (	2	1 (	₹  '	4	-	4				
McCloud River. 0 0 0 0 29 25 63 46 0 0 0 0 0 0 0 Macon, Dublin & Savannah. 31 20 9 24 56 64 60 1 2 0 0 10 0 Macon, Dublin & Savannah. 31 1 7 12 27 42 41 68 2 2 4 1 6 14 Maryland & Pennsylvania. 31 17 24 42 50 85 58 1 0 0 3 3 4 Michigan Central. 10 15 19 36 57 66 75 3 2 6 9 38 44 Midland Valley. 1.5 9 0 1 42 40 72 0 2 0 0 1 2 Minneapolis & St. Louis. 21 27 7 9 17 35 57 8 2 2 1 7 7 6 Minneapolis, Northfield & Southern. 31 35 12 25 1 7 9 17 35 57 8 2 2 1 1 7 6 Minneapolis, St. Paul & Sault Ste. Marie. 8 9 6 14 13 25 60 0 5 0 5 2 4 Minneapolis, St. Paul & Sault Ste. Marie. 12 8 31 32 71 67 97 0 0 1 0 8 1 Minnesota Transfer. 12 8 31 32 71 67 97 0 0 1 0 8 1 Mississippi Central. 7 17 12 14 32 32 59 0 0 0 1 2 4 Missouri & Arkansas. 60 54 68 72 92 91 100 2 13 8 8 17 12 Missouri & Arkansas. 15 2 3 0 0 0 1 2 1 33 1 42 91 0 2 0 0 6 22 Missouri Hansas-Texas 1.5 2.3 6 1 13 42 91 0 2 0 0 6 22 Missouri Hansas-Texas 1.5 2.3 6 1 13 42 91 0 2 0 0 6 22 Missouri Hansas-Texas 1.5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Louisiana, Arkansas & Texas	. 19			-55-		:   ;	6			3		5	i ō.	i i				
Macon, Dublin & Savannah	Louisville & Nashville	1 7			33														
Maine Central 13         16         17         12         27         42         41         68         2         2         4         1         6         14           Maryland & Pennsylvania         31         17         24         42         50         85         58         1         0         0         3         3         4           Michigan Central         10         15         19         36         57         68         75         3         2         6         9         38         44           Midland Valley         1.5         9         0         1         42         40         72         0         2         0         0         1         2           Minneapolis, Northfield & Southern         31         35         12         25          1         0         0         0           1         0         0         0            1         0         0         0             1         0         0         0	Macon Dublin & Savannah	31			24					ĭl :		ól (							
Maryland & Pennsylvania	Maine Central 13	16							8	2	2 4	4	1 .	5 1	4				
Midland Valley       1.5       9       0       1       42       40       72       0       2       0       0       1       2         Minneapolis, St. Louis       21       21       7       9       17       35       57       8       2       2       1       7       6         Minneapolis, Northfield & Southern       31       35       12       25       1       0       0       0       0       1       2       4         Minneapolis, St. Faul & Sault St. East St. Eas			17			5	0 8		8	1 (	0 (	0 :	3						
Minneapolis, Northfield & Southern.         31         35         12         25          1         0         0         0            1         0         0         0             1         0         0         0              1         0         0         0	Michigan Central	. 10								3	2								
Minneapolis, Northfield & Southern.         31         35         12         25          1         0         0         0            1         0         0         0             1         0         0         0              1         0         0         0	Midland Valley			0					2 '		2	il i		+	6 .				
Southern   Southern   Southern   Southern   Southern   Southern   Ste. Marie   St	Minneapolis & St. Louis	- 21	21	1 7	1 8	1	1 3	ə  ə	4	٠ ا٥	٠	4	-1	1	ا ا				
Minneapolls, St. Paul & Sault         8         9         6         14         13         25         60         0         5         0         5         2         4           Minnesota, Dakota & Western.         45         0         0         21         33         100         100         0         0         0         0         1         3           Minnesota Transfer.         12         8         31         32         71         67         97         0         0         0         0         1         2         4           Mississippi Central.         7         17         12         14         32         32         59         0         0         0         1         2         4           Missouri-Hillinois.         2.3         0	Southern Northleid &	21	35	12	25	-		1		1) (	ol (	ol .	0	_					
Ste. Marie	Minneapolis, St. Paul & Sault	- 01	1 50	12			-	-	-	1	Ĭ	Ĭ	1						
Minnesota, Dakota & Western.	Ste. Marie	. 8	9	6	14					0									
Mississippi Central       7       17       12       14       32       32       59       0       0       0       1       2       4         Missouri & Arkansas       60       54       68       72       92       91       100       2       13       8       8       17       12         Missouri-Hansas-Texas       1.5       2.3       0	Minnesota, Dakota & Western	_ 45							0	0									
Missouri & Arkansas     60     54     68     72     92     91     100     21     13     8     8     17     12       Missouri-Illinois     23     0     0	Minnesota Transfer	-   12		31		7	1 6	7 9	7	<u>N</u>				8					
Missouri-Kansas-Texas     1.5     2.3     6     1     13     42     91     0     2     2     0     0     6     22       Missouri-Ransas-Texas     3.6     4.1     3.5     9     20     59     89     2     2     2     6     24     131       Mobile & Ohio     14     15     11     14     29     38     52     5     6     2     6     19     11       Monongahela     22     0     29     31     53     43     14     2     0     1     3     5     0     0     1     0     0     1     0     0     1     1     3     5     0     <	Mississippi Central	- 60		12					9	<u> </u>			ģ 1	7 1					
Missouri-Kansas-Texas     1.5     2.3     6     1     13     42     91     0     2     2     0     0     6     22       Missouri-Racific     3.6     4.1     3.5     9     20     59     89     2     2     2     6     24     131       Mobile & Ohio     14     15     11     14     29     38     52     5     6     2     6     19     11       Monongahela     22     0     29     31     53     43     14     2     0     13     5     0       Monongahela     3.7     7     0     8     16     9     0     0     0     0     0     1     0     0     0     0       Montpelier & Wells River     6     0     0     0     0     0     0     0     0     0     0     0     0     0     0       Nashville, Chattanooga & St.     10     13     0	Missouri-Illinois	- 00			1'2	ا ا	<sup>2</sup>   <sup>9</sup>	1 10	٧	<u>1</u> أمَّ	ก็		4	1 1	<u>-</u>				
Missouri Pacific       3.6       4.1       3.5       9       20       59       89       2       2       2       6       24       131         Mobile & Ohio       14       15       11       14       29       38       52       5       6       2       6       19       11         Monongahela       3.7       7       0       8       16       9       0       0       1       0       0       1       1       0       0       1       1       0       0       1       1       1       0	Missouri-Kansas-Texas	1 1			6 1	·- i	3 4	2 9	ū	ŏ			ō	6 2					
Monongahela Connecting       22       0       29       31       53       43       14       2       0       1       3       5       0         Monongahela       3. 7       7       0       8       16       9       0       0       1       0       0       1       0       0       0       1       0	Missouri Pacific	.   3.		1 3.	5 9	2	:0l 5	9 8		2	2								
Montour	Mobile & Ohio	_ 14	15	11	14		9 3	8 8	2	5	6	2							
Montpolier & Wells River 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Monongahela Connecting	- 22	_  0	29						2		1							
Montpelier & Wells River 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Montour	-  3.			8					ų l									
Nasnville, Chattanooga & St. 19 11 24 27 24 74 77 5 2 14 15 17 27	Montpelier & Walls Biver				10	1	٧	ൌ	٧				٧	٩	٧				
Torrio   10   11   04   07   94   74   77   E   9   14   15   17   27	Nashville. Chattanooga & St		1 "	"	1					٦	ĭ	1		-	-				
	T assign	10	11	24	37				77		3 1								
Newburgh & South Shore	Nevada Northern	_ 0	0	0	1 0	4	14 2	25	0	0	0	0	0	1	0				

Included in Canadian National, 1925-27.
Included in Atchison, Topeka & Santa Fe, 1923.
Includes New Orleans Great Northern, 1935-36.
Includes Nabama & Vicksburg, Gulf & Ship Island, Vicksburg, Shreveport & Pacific, and Yazoo & Mississippi Valley, 1927-36.
Included in Union Pacific, last 6 months 1936.
Included in Union Pacific, last 6 months 1936.
Includes Portland Terminal, 1932-1936.

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	Pe	rcent	age in	specte	d de	fectiv	76		0	rdere	d out	of ser	vice	
	1936	1935	1931	1929	1927	1925	1923	1936	1935	1931	1929	1927	1925	1923
New Orleans Public Belt	4.8 6 11 7	22 12 14 11	11 10 7 10	13 14 25 24	5 25 41 31	28 43 66 48	57 60 61 70	0 2 13 3	0 16 20 1	1 8 7 10	1 6 22 30	0 19 55 14	2 27 59 47	2 78 53 36
Hartford.  New York, Ontario & Western.  Norfolk & Portsmouth Belt  Norfolk & Western.  Norfolk Southern.  Northern Pacific.  Northern Pacific Terminal  Northwestern Pacific.  Oregon Short Line 18  Oregon Washington Railroad &	12 21 25 12 10 23 6 2 13	16 23 5 3. 3 26 30 2. 6	14 36 6 9 16 16 20 8	12 38 23 23 24 13 12 1 22	23 36 44 42 45 29 22 6 27	39 44 48 49 45 37 12 6 42	73 71 53 78 57 61 32 57 61	4 9 2 5 3 9 0 0	3 0 0 0 13 0 0	2 3 0 2 3 22 0 0 4	0 16 0 9 2 6 0 0	5 10 0 24 4 50 0	12 6 1 24 5 28 0 0 0 3	131 7 1 163 10 113 0 12 13
Navigation <sup>16</sup> Patapsco & Back Rivers Pennsylvania Pennsylvania-Reading Seashore	17 6 11	14 0 11	16 0 10	12 50 33	17 47 44	11 44 61	35 60 76	2 0 58	1 0 71	2 0 33	2 1 153	4 1 335	6 0 573	13 1 687
Peoria & Eastern <sup>17</sup> Peoria & Pekin Union Pere Marquette Philadelphia, Bethlehem &	13 15 0 4.7	19 26 4. 5 8	30 40 12	14 21	23 38	31 57	54 83	0 1 0 0	3 2 0 0	5 0 3	 0 8	0 14	1 21	1 68
New England Pittsburgh & Lake Erie Pittsburg & Shawmut Pittsburgh & West Virginia Pittsburg, Shawmut & North	11 10 3.7 33	24 12 0 42	21 1.9 4 32	65 6 4 57	74 12 0 39	76 10 47 0	67 27 52 33	1 1 0 10	6 4 0 27	1 0 0 4	16 0 0 30	14 0 0 8	2 0 0 0	2· 10· 2 0
ern Quebec Central Reading Richmond, Fredericksburg &	14 67 11	3. 9 20 14	3.6 0 13	8 100 33	25 42	53 48	86 59	0 0 7	0 1 10	0 0 5	1 0 31	<u>2</u>	0 <u></u> - <u>-</u> - <u>-</u> <u>-</u>	0 12
Potomae Rio Grande Southern River Terminal Rutland St. Johnsbury & Lake Cham-	21 73 29 4. 7	21 46 33 7	14 0 0 6	18 0 71 6	30 70 43 12	43 62 70 44	58 100 0 54	3 1 0 0	2 0 3 2	0	1 0 5 0	1 8 1 1	2 8 0 3	3 2 0 1
plain St. Joseph & Grand Island 18 St. Louis-San Francisco St. Louis-Southwestern San Diego & Arizona Eastern Savannah & Atlanta Seaboard Air Line Sierra Railway of California	2 6 3.8 12 14 44 8	4.8 13 4.3 13 9 7 3	16 21 3.9 8 13 19 9	11 14 4.3 38 80 37	36 22 22 30 67 56	38 49 47 55 73 51	43 88 86 44 68 55	1 0 2 3 1 5 10	0 0 4 10 0 0 8	0 0 1 4 2 0 2	0 7 2 4 0 24	0 12 22 3 0 43	1 65 14 0 2 33	1 346 54 1 3
South Buffalo Southern Pacific, lines east. Southern Pacific, lines west. Southern Pacific of Mexico Southern Southern Spokane International Spokane, Portland & Seattle Steetton & Highspire	9 4. 6 13 60 14 7 17 26	5 6 13 22 7 30 33 23	39 3.3 11 0 9 9 22 19	23 5 24 30 12 13 22 24	29 13 27 100 24 28 33 48	75 30 33 100 36 0 32	0 47 38 59 37 60	0 4 14 3 75 0 0	0 4 12 1 20 1 2	8 1 13 0 15 0 1 1	0 3 47 2 13 0 1	0 1 10 50 3 38 0 2	0 37 51 1 56 0 4	0 28 24 177 2 13
Tennessee, Alabama & Georgia. Tennessee Central. Tennessee Coal, Iron & R. R Terminal R. R. Assn. of St.	0 31 33	24 17	14 7	47 38	65 67	74 40	89 50	0 3 0	<u>2</u>	0	$\begin{bmatrix} 14\\0 \end{bmatrix}$	40	23	63 0
Louis Texas & Pacific Texas-Mexican Texas Pacific-Missouri Pacific	36 4.8 7	36 21 11	32 0 27	41 1 43	44 12 50	62 16 33	76 62 50	11 1 0	44 31 0	4 0 0	0 1 0	3 3 1	1 0	6 91 1
of New Orleans Tionesta Valley Toledo, Peoria & Western Toledo Terminal Toronto, Hamilton & Buffalo Tremont & Gulf	20 0 0 0 67 0	13 0 0 0 0 0 9	0 100 25 5 0 0	4 38 65 45 0 67 0	10 17 88 35 0 20	57 80 87 3 58 75	83 100 93 41	0 0 0 0 0	2 0 0 0 0 0	0 0 2 0 0 0	0 2 4 0 0 0	0 2 7 0 0 2	2 7 2 0 3 0	0 4 3

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	rcenta	ge ins	pecte	d de	ectiv	Ordered out of service								
Road	1936	1935	1931	1929	1927	1925	1923	1936	1935	1931	1929	1927	1925	1923	
Union Pacific <sup>19</sup> Union Upper Merion & Plymouth Utah. Virginian Wabash Washington Terminal Western Maryland. Western Pacific. Wheeling & Lake Erie. Wichita Falls & Southern. Winston-Salem Southbound Wrightsville & Tennille. Less than 10, discontinued roads, and industrial locomotives.	4. 1 40 18 25 32	24 8 7 8 33 0 5	0 13 16 8 18 22 3. 2	40	43 42 19 55 0 50 24	26 58 477 40 54 36 67 87 56 54	199 75 82 89 76 37 74 100 77 29	10 0 12 1 1 1 0 5 2 2 2 0 0 1 2 1 1 1 0 0 1 2 1 1 1 1 1 1	0 4 0 1 1 1 2 1 0 0				583		
All roads	12	12	10	21	31	46	65	852	921	688	1, 490	2, 539	3, 637	7, 07. 	

<sup>19</sup> Includes Los Angelos & Salt Lake, Oregon Short Line, Oregon-Washington R. R. & Navigation, and St. Joseph & Grand Island, last 6 months 1936.
Fractional percentages not shown unless percent defective is less than 5, otherwise nearest whole number

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.

<sup>Includes Ohio Central Lines, 1927–1936.
Included in Union Pacific, last 6 months 1936.
Included in Union Pacific, last 6 months 1933.
Included in Cleveland, Cincinnati, Chicago & St. Louis prior to 1931.
Included in Union Pacific, last 6 months 1936.</sup>