

INTERSTATE COMMERCE COMMISSION

---

TWENTY-THIRD ANNUAL REPORT

OF THE

CHIEF INSPECTOR  
BUREAU OF LOCOMOTIVE INSPECTION

TO THE

INTERSTATE COMMERCE COMMISSION

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FISCAL YEAR ENDED  
JUNE 30, 1934



UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1934

**ANNUAL REPORT OF THE CHIEF INSPECTOR  
BUREAU OF LOCOMOTIVE INSPECTION**

OCTOBER 1, 1934.

*To the Interstate Commerce Commission:*

In compliance with section 7 of the act of February 17, 1911, as amended, the Twenty-third Annual Report of the Chief Inspector, covering the work of the bureau during the fiscal year ended June 30, 1934, 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—					
	1934	1933	1932	1931	1930	1929
Number of locomotives for which reports were filed.....	54, 283	56, 971	59, 110	60, 841	61, 947	63, 562
Number inspected.....	89, 716	87, 658	96, 924	101, 224	100, 794	96, 465
Number found defective.....	10, 713	8, 388	7, 724	10, 277	16, 300	20, 185
Percentage inspected found defective.....	12	10	8	10	16	21
Number ordered out of service.....	754	544	527	688	1, 200	1, 490
Total number of defects found.....	43, 271	32, 733	27, 832	36, 968	60, 292	77, 268

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

	Year ended June 30—					
	1934	1933	1932	1931	1930	1929
Number of accidents.....	192	157	145	230	295	356
Percent increase or decrease from previous year.....	<sup>1</sup> 22.3	18.3	36.9	22	17.1	15
Number of persons killed.....	7	8	9	16	13	19
Percent increase or decrease from previous year.....	12.5	11.1	43.7	123	31.6	36.6
Number of persons injured.....	223	256	156	269	320	390
Percent increase or decrease from previous year.....	12.9	<sup>1</sup> 64.1	42	15.9	17.9	15.8

<sup>1</sup> Increase.TABLE III.—Accidents and casualties caused by failure of some part or appurtenance of the steam locomotive boiler <sup>1</sup>

	Year ended June 30—							
	1934	1933	1932	1931	1930	1929	1915	1912
Number of accidents.....	63	53	43	91	105	119	424	856
Number of persons killed.....	4	3	8	15	12	14	13	91
Number of persons injured.....	77	55	46	122	113	133	467	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

	Year ended June 30—									
	1934		1933		1932		1931		1930	
	Killed	In-jured	Killed	In-jured	Killed	In-jured	Killed	In-jured	Killed	In-jured
Members of train crews:										
Engineers.....	1	57	2	58	3	59	5	73	4	100
Firemen.....	1	73	1	48	4	49	5	75	4	123
Brakemen.....	1	32		17	2	18		39	4	32
Conductors.....	1	17		10		7		21		10
Switchmen.....		6		8		3		8		10
Roundhouse and shop employees:										
Boiler makers.....		2		1		1		3		1
Machinists.....		5		2		1		1		3
Foremen.....							2	3		1
Inspectors.....		3		1						3
Watchmen.....	1	4	2	3		1		5		2
Boiler washers.....										2
Hostlers.....	1	5		1				4		3
Other roundhouse and shop employees.....		1		3		4	2	6	1	8
Other employees.....	1	4		2		2		6		6
Nonemployees.....		14	3	102		6	1	22		16
Total.....	7	223	8	256	9	156	16	269	13	320

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

	Year ended June 30—				
	1934	1933	1932	1931	1930
Number of locomotive units for which reports were filed.....	1,288	1,349	1,274	1,242	1,135
Number inspected.....	1,436	1,368	1,411	1,256	1,306
Number found defective.....	69	74	57	75	120
Percentage inspected found defective.....	5	5	4	6	9
Number ordered out of service.....	4	4	6	3	6
Total number of defects found.....	158	176	126	192	289

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

	Year ended June 30—				
	1934	1933	1932	1931	1930
Number of accidents.....	1	2	2	5	3
Number of persons killed.....				1	
Number of persons injured.....	1	2	2	5	3

TABLE VII.—Number of casualties classified according to occupation—Locomotives other than steam

	Year ended June 30—									
	1934		1933		1932		1931		1930	
	Killed	In-jured	Killed	In-jured	Killed	In-jured	Killed	In-jured	Killed	In-jured
Members of train crews:										
Engineers.....						1		1		2
Firemen.....					2		1	1		1
Brakemen.....								2		
Roundhouse and shop employees:										
Inspectors.....										
Other roundhouse and shop employees.....		1						1		
Other employees.....						1				
Total.....		1		2		2	1	5		3

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

Part or appurtenance which caused accident	Year ended June 30—														
	1934			1933			1932			1931			1930		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Air reservoirs.....	1		1	1		1									
Aprons.....	6		9	1		1		1		1		3			
Arch tubes.....	1		1	1		1		1		2		3			
Ash-pan blowers.....	2		2												
Axles.....	1		1	5	3	16			1	3		6	7		2
Blow-off cocks.....	5		5	8		8				5		5			4
Boiler checks.....	4		4							1		1			5
Boiler explosions:															
A. Shell explosions.....															
B. Crown sheet; low water; no contributory causes found.....	6	4	18	5	2	6	5	5	6	10	7	32	6	7	5
C. Crown sheet; low water; contributory causes or defects found.....	1		3				1	3	3	3	8	8	5	4	8
D. Miscellaneous fire-box failures.....	1		1				2	1	1	1	1	1	1		1
Brakes and brake rigging.....	7		11	5		5	10	8	9	9	9	21			23
Couplers.....	9		10	8		9	9	4	9	10	8	9	9	1	13
Crank pins, collars, etc.....	2		2	2		2	4	4	7	4	4	3	3		5
Crossheads and guides.....	2	2	2	2	1	2	2	4	4	4	4	4	4		5
Cylinder cocks and rigging.....	2		2	2		2	3	3	3	3	3	1	1		1
Cylinder heads and steam chests.....	3		3	4		8	1	1	1	2	2	2	2		2
Dome caps.....	1		1	1		1	1	1							1
Draft appliances.....	1		1	1		1	1	1				1	1		1
Draw gear.....	1		1	3		3	1	1				8	8		8
Fire doors, levers, etc.....	4		8	5		6	2	2	2	4	13	13	10		14
Flues.....	4		8	5		6	4	4	4	13	13	10	10		14
Flue pockets.....															
Footboards.....	3		3	2		2	2	2	4	4	4	7	7		7
Gage cocks.....															
Grease cups.....	5		5	1		1	1	1	1	1	3	3	3		3
Grate shakers.....	7		7	4		4	7	7	4	6	6	8	8		18
Handholds.....				2		2	3	3	3	1		2	2		2
Headlights and brackets.....				2		2	3	3	1			1	1		2
Injectors and connections (not including injector steam pipes).....	1		1	4		4	1	1	5	5	5	4	4		4
Injector steam pipes.....	3		3	1		1	1	1	1	1	2	2	2		2
Lubricators and connections.....				2		2	3	3	5	1	1	1	1		1
Lubricator glasses.....							1	1	1						
Patch bolts.....															
Pistons and piston rods.....	2		2	2		2	1	1	5	5	5				3
Plugs, arch tube and washout.....				2		2	3	3				2	2		3
Plugs in fire-box sheets.....															
Reversing gear.....	13		14	8		8	12	12	12	12	14	14	14		14
Rivets.....												1	1		1
Rods, main and side.....	10		12	3		3	8	9	4	4	4	11	11		15
Safety valves.....															
Sanders.....	3	1	2	2		2			3	3	3	2	2		2
Side bearings.....															
Springs and spring rigging.....	3		3	2		2	3	3	4	4	4	4	4		4
Squirt hose.....	9		10	4		4	10	10	7	7	9	9	9		20
Stay bolts.....	1		1	4		4	2	2	4	4	4	4	4		5
Steam piping and blowers.....	4		4	2	1	1			3	3	5	5	5		5
Steam valves.....	1		1	1		1			4	4	4	6	6		6
Studs.....															
Superheater tubes.....	2		5	3		3	2	2	4	4	5	5	5		7
Throttle glands.....	1		1												
Throttle leaking.....															
Throttle rigging.....	2		2				1	1	1	1	1	3	3		3
Trucks, leading, trailing, or tender.....				1		1	1	1	3	1	1	2	2		5
Valve gear, eccentrics and rods.....	2		2	4		4	6	6	6	6	8	8	8		8
Water glasses.....	11		11	11		11	7	7	7	8	2	15	15		15
Water-glass fittings.....	1		1									1	1		1
Wheels.....				4		4	1	1				3	3		4
Miscellaneous.....	46		47	33	1	32	29	29	49	50	50	53	53		64
Total.....	192	7	223	157	8	256	145	9	156	230	16	269	295	13	320

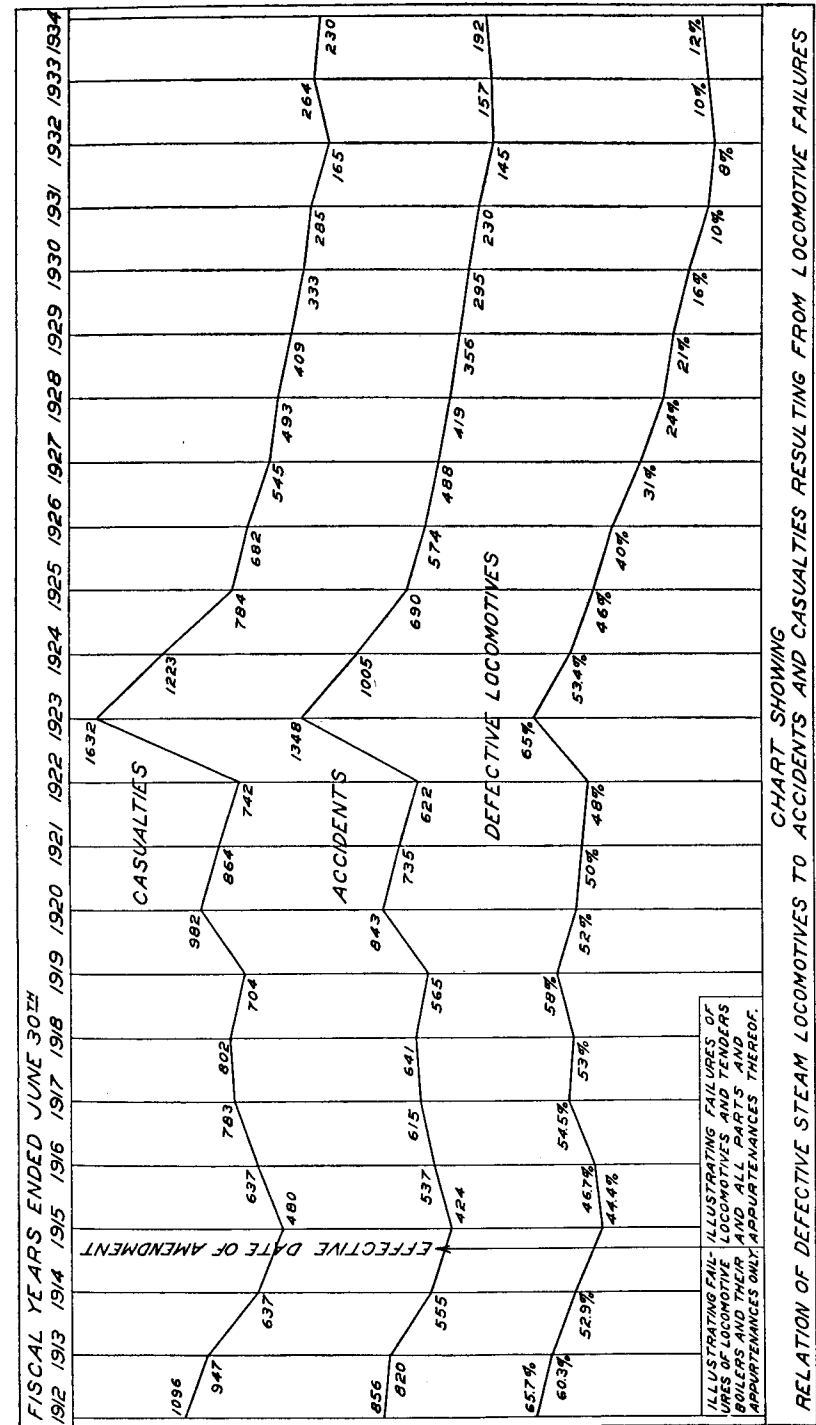


TABLE IX.—Accidents and casualties resulting from failures of locomotives other than steam, and their appurtenances

Part or appurtenance which caused accident	Year ended June 30—														
	1934			1933			1932			1931			1930		
	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured	Accidents	Killed	Injured
Circuit breakers.....															
Insulation.....	1		1	1		1			1	1		1			1
Pantagraphs and trolleys.....							1		1			1			
Third-rail shoes.....							1		1						
Transformers.....										3		4	2		2
Miscellaneous.....				1		1									
Total.....	1		1	2		2	2		2	5	1	5	3		3

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

Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—					
	1934	1933	1932	1931	1930	1929
1. Air compressors.....	660	474	417	481	873	1,202
2. Arch tubes.....	127	51	54	60	87	104
3. Ash pans and mechanism.....	87	40	69	81	76	132
4. Axles.....	6	21	13	10	12	20
5. Blow-off cocks.....	289	210	144	191	325	442
6. Boiler checks.....	407	293	214	263	521	761
7. Boiler shell.....	372	296	220	430	579	841
8. Brake equipment.....	2,326	1,696	1,645	1,923	2,706	3,894
9. Cabs, cab windows, and curtains.....	1,342	1,183	851	1,484	3,066	2,140
10. Cab aprons and decks.....	343	309	262	415	710	1,005
11. Cab cards.....	129	121	162	211	226	305
12. Coupling and uncoupling devices.....	54	67	85	98	122	154
13. Crossheads, guides, pistons, and piston rods.....	1,100	773	763	856	1,421	1,887
14. Crown bolts.....	77	67	50	96	95	129
15. Cylinders, saddles, and steam chests.....	1,491	1,084	841	1,265	2,311	3,210
16. Cylinder cocks and rigging.....	654	374	376	411	848	967
17. Domes and dome caps.....	105	76	45	83	154	227
18. Draft gear.....	401	318	325	568	950	1,310
19. Draw gear.....	480	357	371	640	1,003	1,367
20. Driving boxes, shoes, wedges, pedestals, and braces.....	1,472	1,080	821	925	1,359	1,993
21. Fire-box sheets.....	356	246	235	341	471	657
22. Flues.....	203	150	120	187	254	334
23. Frames, tailpieces, and braces, locomotive.....	951	669	611	740	1,271	1,377
24. Frames, tender.....	128	80	86	105	177	297
25. Gages and gage fittings, air.....	212	145	156	192	290	309
26. Gages and gage fittings, steam.....	289	258	214	324	553	678
27. Gage cocks.....	384	388	330	415	783	1,114
28. Grate shakers and fire doors.....	404	245	288	410	767	1,114
29. Handholds.....	377	363	382	562	865	1,125
30. Injectors, inoperative.....	33	20	31	55	103	86
31. Injectors and connections.....	1,909	1,357	1,168	1,815	3,275	4,484
32. Inspections and tests not made as required.....	8,173	6,358	3,801	4,862	7,456	9,246
33. Lateral motion.....	351	269	237	289	372	618
34. Lights, cab and classification.....	79	76	55	77	119	121
35. Lights, headlights.....	218	169	119	180	373	488
36. Lubricators and shields.....	215	157	119	176	312	423
37. Mud rings.....	247	232	166	318	445	636
38. Packing nuts.....	491	419	402	523	828	991
39. Packing, piston rod and valve stem.....	833	592	444	706	1,429	1,708
40. Pilots and pilot beams.....	174	123	145	160	272	371
41. Plugs and studs.....	242	151	176	182	348	482
42. Reversing gear.....	390	254	202	299	579	788
43. Rods, main and side, crank pins, and collars.....	1,670	1,327	1,256	1,520	2,488	3,465
44. Safety valves.....	108	53	63	61	116	170
45. Sanders.....	697	376	289	314	804	1,008
46. Springs and spring rigging.....	2,854	2,122	1,851	2,161	3,311	4,557
47. Squirt hose.....	107	93	96	184	313	387
48. Stay bolts.....	285	219	181	293	395	542
49. Stay bolts, broken.....	445	368	552	938	1,068	1,197
50. Steam pipes.....	489	338	285	512	730	925

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

Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—					
	1934	1933	1932	1931	1930	1929
51. Steam valves.....	267	193	143	226	399	471
52. Steps.....	567	498	622	676	1,021	1,394
53. Tanks and tank valves.....	862	600	587	732	1,426	1,717
54. Telltale holes.....	93	90	108	151	183	174
55. Throttles and throttle rigging.....	639	448	434	574	1,175	1,554
56. Trucks, engine and trailing.....	898	664	648	714	1,141	1,605
57. Trucks, tender.....	918	747	766	1,059	1,531	2,144
58. Valve motion.....	784	640	520	497	827	1,067
59. Washout plugs.....	776	623	599	815	1,283	1,871
60. Train-control equipment.....	8	4	13	9	48	60
61. Water glasses, fittings, and shields.....	907	716	676	955	1,501	1,816
62. Wheels.....	734	580	603	750	1,025	1,325
63. Miscellaneous—signal appliances, badge plates, brakes (hand).....	572	423	325	418	691	1,101
Total number of defects.....	43,271	32,733	27,832	36,968	60,292	77,268
Locomotives reported.....	54,283	56,971	59,110	60,841	61,947	63,562
Locomotives inspected.....	89,716	87,658	96,924	101,224	100,794	96,465
Locomotives defective.....	10,713	8,388	7,724	10,277	16,300	20,185
Percentage of inspected found defective.....	12	10	8	10	16	21
Locomotives ordered out of service.....	754	544	527	688	1,200	1,490

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

Parts defective, inoperative or missing, or in violation of rules	Year ended June 30—					
	1934	1933	1932	1931	1930	1929
Air compressors.....	3	2	3	4	5	6
Axles.....						1
Boiler.....	1				2	
Brake equipment.....	15	16	13	23	40	44
Cabs and cab windows.....	9	14	6	10	14	39
Cab floors, aprons, and deck plates.....	1	1	2	1	2	3
Controllers, relays, circuit breakers, and switch groups.....	5			3		1
Current-collecting apparatus.....	3	2	7		7	10
Draft gear.....	8	8	13	11	17	36
Draw gear.....			2		1	
Driving boxes, shoes, wedges, pedestals, and pedestal braces.....	7		4	6	1	16
Frames, tailpieces, and braces.....	6	2		2	3	
Fuel tank, its piping and valves.....	4	1	3	3	15	1
Gages and gage fittings, air.....	2	3	3	1	5	3
Gears and pinions.....	1				3	4
High-tension equipment not properly guarded against accidental contact.....			2	4	7	5
Inspections and tests not made as required.....	52	58	23	41	45	40
Insulation.....	2	2			1	
Internal-combustion engine defects, including parts and appliances.....	4	18		1	2	
Jack shafts.....		1		2	4	5
Lateral motion, wheels.....	3	1	2	1	3	3
Lights, cab and classification.....		4	3	7	7	17
Lights, headlights.....		3	1	3	3	5
Meters, volt and ampere.....				2	2	1
Motors and generators.....	4	8	1	10	23	11
Pilots and pilot beams.....		4		2	4	1
Quills.....				1		
Rods, motor, main and side, drive shafts.....	4	2		1	1	
Sanders.....	2			4	8	8
Springs and spring rigging, driving and truck.....	4	8	9	10	21	24
Steam pipes.....				1		
Switches, hand-operated, and fuses.....	1	4				2
Transformers, resistors, and rheostats.....	1		2			2
Trucks.....	3	7	5	11	11	14
Water glasses, fittings, and shields.....			1			
Wheels.....	8	5	11	12	5	6

## SPECIFICATION CARDS AND ALTERATION REPORTS

Under rule 54 of the Rules and Instructions for Inspection and Testing of Steam Locomotives, 120 specification cards and 3,655 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, 37 specifications and 8 alteration reports were filed for locomotive units and 3 specifications and 25 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.

A. G. PACK, *Chief Inspector.*

### ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF STEAM LOCOMOTIVES AND TENDERS AND THEIR APPURTENANCES DURING THE FISCAL YEAR ENDED JUNE 30, 1934, 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.]

## ALTON RAILROAD:

\*\*July 24, 1933, locomotive 2986, Springfield, Ill. Squirt hose burst; hose defective; one injured.

February 28, 1934, locomotive 2989, Marshall, Mo. Clear-vision window slammed shut, breaking the glass, and parts of the shattered glass struck employee's eye; window was hinged at the top of frame and was free to swing on the hinges; hook and screw eye for securing the window in position were missing; one injured.

\*March 2, 1934, locomotive 2975, Venice, Ill. Left front sander on locomotive inoperative; one injured.

\*May 2, 1934, locomotive 2612, Washington, Ill. Spanner nut connection in front of left injector leaking; one injured.

Four accidents; four injured.

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

\*August 5, 1933, locomotive 4112, Hurdland, Mo. Bushing on middle side rod broke and a piece of bushing struck employee; one injured.

September 27, 1933, locomotive 710, Abilene, Kans. Crown sheet failure caused by overheating due to low water; one injured.

November 3, 1933, locomotive 3805, near Scholle, N. Mex. Undesired emergency application of brakes caused by defective condition of brake pipe vent valve; vent valve erratic in functioning due to excessive piston friction and too slow charging; one injured.

November 27, 1933, locomotive 3274, Smithshire, Ill. Stoker slide hook slipped out of hole in slide; hook had been bent from its standard shape; one injured.

\*\*April 8, 1934, locomotive 3847, Woodford, Calif. Smoke deflector failed to operate, apparently caused by end of deflector catching on jacket band; one injured.

\*April 24, 1934, locomotive 3736, Cadiz, Calif. Feed water heater return pipe became disconnected between locomotive and tender; one injured.

Six accidents; six injured.

## ATLANTA, BIRMINGHAM &amp; COAST RAILROAD:

May 31, 1934, locomotive 120, Manchester, Ga. Pin in forward end of reach rod broke, permitting reach rod to disconnect from reversing yoke and cause reverse gear to be inoperative; one injured.

One accident; one injured.

## ATLANTIC COAST LINE RAILROAD:

March 8, 1934, locomotive 1695, Owen, Ga. Shaker bar slipped off grate shaker post; bar burred and improper fit on post; one injured.

May 26, 1934, locomotive 1622, Drifton, Fla. Fire tube failed at defective safe end weld; two injured.

Two accidents; three injured.

## BALTIMORE &amp; OHIO RAILROAD:

\*\*September 7, 1933, locomotive 7521, near DuBois, Pa. Main section of side rod, low pressure engine, failed through no. 2 bushing; back ends of both main low pressure pedestal binders and both main wedges were loose with wedges down on binders, due to poorly fitted bolts and nuts; wedges and binders on low pressure engine reported frequently since August 1 but proper repairs not made; one injured.

September 16, 1933, locomotive 2840, Minnie, W. Va. Air hose on rear of tender burst causing sudden stop; two injured.

December 24, 1933, locomotive 7307, near Altamont, Md. Crown sheet failure caused by overheating due to low water; two injured.

March 10, 1934, locomotive 7119, Garrett, Pa. Steam pipe expansion joints leaking; one injured.

Four accidents; six injured.

#### BOSTON & ALBANY RAILROAD:

\*\*December 27, 1933, locomotive 123, Framingham, Mass. Cab ventilator cover was blown off; cover not securely fastened; one injured.

\*\*March 24, 1934, locomotive 1422, Pittsfield, Mass. Handwheel of power reverse gear suddenly moved with violence, resulting in injury to employee; one injured.

\*\*April 13, 1934, locomotive 64, Boston, Mass. Lug of uncoupling rod casting plate opened up, permitting uncoupling lever to become disconnected from operating chain to coupler lock; one injured.

April 28, 1934, locomotive 613, Chester, Mass. Water glass burst; one injured.

Four accidents; four injured.

#### BOSTON & MAINE RAILROAD:

August 4, 1933, locomotive 447, Mechanicville, N. Y. Slipped on deck while shaking grates; deck planking badly worn and deck plate at back head blocked up 2 inches higher than deck; one injured.

December 27, 1933, locomotive 433, Watertown, Mass. Struck by reverse lever which went violently to front end of quadrant; one injured.

Two accidents; two injured.

#### CENTRAL OF GEORGIA RAILWAY:

July 18, 1933, locomotive 174, Atlanta, Ga. Burned by steam and hot water from water-glass drain pipe which was improperly applied; one injured.

\*\*March 8, 1934, locomotive 177, Macon, Ga. Whistle valve stuck open; a piece of threaded section chipped from a pipe connection was found lodged between whistle valve and seat; one injured.

Two accidents; two injured.

#### CENTRAL RAILROAD OF NEW JERSEY:

August 2, 1933, locomotive 760, White House, N. J. Stop lug of fire door broke off while door was locked in open position, permitting door to close uncontrolled; fire door was reported broken at stop lug before locomotive was dispatched on this trip; one injured.

\*September 27, 1933, locomotive 211, Port Newark, N. J. Spring hanger key broke off; one injured.

January 27, 1934, locomotive 323, Elizabethport, N. J. Grate shaker bar slipped off lever, due to improper fit; one injured.

Three accidents; three injured.

#### CHESAPEAKE & OHIO RAILWAY:

\*October 7, 1933, locomotive 129, Columbus, Ohio. Cylinder cock rod came out of pocket; one injured.

October 23, 1933, locomotive 1162, Bath, Ind. Blow-off valve discharge pipe disconnected; threads stripped from blow-off valve nipple; one injured.

December 8, 1933, locomotive 25, Covington, Ky. Crown sheet failure caused by overheating due to low water; one injured.

May 20, 1934, locomotive 2309, Clyffside, Ky. Main rod broke at front end of bottom jaw, due to old fracture covering approximately 90 percent of cross-sectional area; main rod defects reported on April 22, May 15, 17, and 19; three injured.

Four accidents; six injured.

#### CHICAGO & NORTH WESTERN RAILWAY:

October 29, 1933, locomotive 2474, West Chicago, Ill. Blow-off cock stuck open; one injured.

\*\*November 11, 1933, locomotive 2223, Chicago, Ill. Insufficient clearance between back edge of cab apron and tender cistern water legs; one injured.

January 13, 1934, locomotive 2574, near Montour, Iowa. Bonnet blew out of coal pusher steam operating valve, due to loose fit; bonnet threads of improper taper; both coal pusher automatic drain valves leaking badly; "Coal pusher

steam valve leaks bad" was reported approximately 10 hours before locomotive was dispatched on this trip; one injured.

Three accidents; three injured.

#### CHICAGO, BURLINGTON & QUINCY RAILROAD:

July 18, 1933, locomotive 2818, Omaha, Nebr. Crown sheet failure caused by overheating due to low water; three killed, ten injured.

September 8, 1933, locomotive 5290, near Anselmo, Nebr. Fire tube broke off at back flue sheet due to being badly grooved and corroded around entire circumference; two injured.

October 1, 1933, locomotive 2937, near North River, Mo. Collar on water column steam pipe failed; collar less than standard thickness and not properly brazed to pipe; one injured.

Three accidents; three killed, thirteen injured.

#### CHICAGO GREAT WESTERN RAILROAD:

\*August 10, 1933, locomotive 867, South Freeport, Ill. Lugs broken from both ash pan slides and connecting rods to slides bent and broken, causing ash pan to be inoperative; left main driving brake shoe and head missing; apparently brake shoe head coming off had broken lugs to ash pan slide; one injured.

\*\*February 7, 1934, locomotive 484, Chicago, Ill. Water glass burst; one injured.

\*\*April 17, 1934, locomotive 869, Gladbrook, Iowa. Left cylinder packing broke and blew out due to insufficient lubrication; cylinder packing reported on April 4, 5, and 12, and condition of lubricator reported on April 5 and 12; one injured.

Three accidents, three injured.

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

\*\*August 31, 1933, locomotive 5007, near Savanna, Ill. Cab apron gave way due to hinge bolt being missing; one injured.

\*\*November 16, 1933, locomotive 8377, Atkins, Iowa. Vertical cab handhold broke at bottom end due to old flaw; one injured.

March 14, 1934, locomotive 8286, near West Clinton, Ind. Crown sheet failure caused by overheating due to low water; opening in top of water glass restricted about 40 percent due to glass being broken at top and gasket forced through break into glass; three injured.

March 24, 1934, locomotive 2767, Brandon, Wis. Valve motion union link failed through defective forge weld, permitting valve to stop in central position which trapped steam in cylinder and caused front cylinder head to fail; one injured.

May 20, 1934, locomotive 7228, between Richfield and Germantown, Wis. Reverse lever latch broke at fusion weld joining upper and lower sections, permitting latch to become disengaged from quadrant and reverse lever to go to full forward position; one injured.

Five accidents; seven injured.

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

\*\*September 9, 1933, locomotive 4010, Mokena, Ill. Ash pan dump lever latch key broke and was thrown from rapidly moving locomotive, striking employee; key which failed was not the carrier's standard key; one injured.

\*\*November 21, 1933, locomotive 930, Burr Oak, Ill. Injector steam pipe spanner nut burst; failure occurred through slots provided for wrench, which had old fractures; spanner nut weighed 23 ounces while company's standard nut weighs 42 ounces; spanner nut reported leaking on November 7, 17, 18 (2 times), and 21; one injured.

May 28, 1934, locomotive 5036, Herington, Kans. Turret valve bonnet blew out when employee attempted to repair a leak in air compressor steam pipe; threads in valve body badly corroded and wasted away and threads on bonnet badly worn. The defective valve was reported to be repaired on the shop report covering work to be done at the time class 3 repairs were applied and the shop form indicates that repairs were made to the valve, the locomotive being turned out of shop on April 30. At the time of accident locomotive was being prepared for its first service since class 3 repairs were applied; one injured.

Three accidents; three injured.

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

June 8, 1934, locomotive 387, near Chetek, Wis. Injector steam pipe collar broke through old fracture, due to excessive vibration; collar not properly brazed; one injured.

One accident; one injured.

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

\*\*September 7, 1933, locomotive 227, Marion, Ohio. Bell rope broke; one injured.

October 18, 1933, locomotive 163, Hughes, Ohio. Main rod strap broke; old fracture covered approximately 80 percent of cross-sectional area; "Key up both main rods" was reported on October 1, 2, 3, 4, 6, 7, 8, 9, 12, 13, 15, and 17; one injured.

May 8, 1934, locomotive 6615, Galion, Ohio. Rung of tender tank ladder broke due to old fracture; one injured.

Three accidents; three injured.

**CLINCHFIELD RAILROAD:**

\*November 11, 1933, locomotive 510, Trammel, Va. Board fell from cab ventilator, striking employee; board reported loose at end of previous trip; one injured.

One accident; one injured.

**DELAWARE, LACKAWANNA & WESTERN RAILROAD:**

July 23, 1933, locomotive 231, Jersey City, N. J. Water glass burst, breaking 3 of the 4 glass panels of water-glass shield; one injured.

December 12, 1933, locomotive 162, Scranton, Pa. Employee's eye injured by a piece of wire hanging from cab hood curtain; one injured.

January 8, 1934, locomotive 1214, Portway, N. Y. Pilot beam pulled from pusher locomotive when leading locomotive started the train; bolts used for securing pilot beam to filler center casting were smaller than required by company's blueprint and three bolts were missing; holes in filler casting and pilot beam badly out of round, causing bolts to loosen; ribs in filler center casting, left side, broken and welded prior to accident; metal at break porous; one injured.

\*\*June 26, 1934, locomotive 1107, Utica, N. Y. While attempting to disconnect steam heat hose from locomotive, employee was burned by steam and hot water which had accumulated in hose due to leaky steam heat valve; one injured.

Four accidents; four injured.

**DENVER & RIO GRANDE WESTERN RAILROAD:**

September 29, 1933, locomotive 1024, Salt Lake City, Utah. Throttle lever fulcrum stud broke; one injured.

\*\*December 11, 1933, locomotive 3610, Salida, Colo. Employee was scalded due to opening the wrong valve; intending to open squirt hose valve, he instead opened valve that furnished hot water for mixing antifoam compound which had a section of hose attached; one injured.

April 1, 1934, locomotive 1709, Orsa, Colo. Piston head and bull ring broke in left cylinder; one injured.

Three accidents; three injured.

**DENVER & SALT LAKE RAILWAY:**

\*September 18, 1933, locomotive 213, near Crater, Colo. Coupling between locomotive and first car parted, causing emergency application of brakes; one injured.

One accident; one injured.

**ERIE RAILROAD:**

\*July 1, 1933, locomotive 2565, Goshen, N. Y. Rod connected to whistle lever became disconnected; one injured.

July 3, 1933, locomotive 3057, Monterey, Ind. Employee's foot slipped from cab step, causing him to fall to the ground; insufficient foot clearance between the cab step and cab floor due to bolts securing side of cab to cab floor extending to within 1/8 inches of cab step; one injured.

\*\*August 23, 1933, locomotive 3381, Susquehanna, Pa. Reverse gear wheel spun while reverse gear was being moved, due to bolt at connection of inside radius bar to reverse yoke working out and fouling on bell crank; cotter, nut, and collar missing from bolt that worked out; one injured.

\*\*September 14, 1933, locomotive 3349, Jamestown, N. Y. Employee fell from running board while giving attention to defective blower valve and bell rope which was tangled around whistle; bell ringer inoperative, necessitating the use of bell rope; blower valve threads stripped; one injured.

February 11, 1934, locomotive 3346, Kent, Ohio. Union nut on stoker steam pipe broke while being tightened with hammer and chisel; one injured.

Five accidents; five injured.

**FORT WORTH & DENVER CITY RAILWAY:**

April 13, 1934, locomotive 153, near Kitalou, Tex. Eccentric strap broke; eccentric strap bolt was broken or missing; one injured.

One accident; one injured.

**GRAND TRUNK WESTERN RAILWAY:**

September 9, 1933, locomotive 6037, near Thornton Junction, Ill. Main driving wheel axle broke at wheel center, due to old fracture covering approximately 90 percent of cross-sectional area; one injured.

November 9, 1933, locomotive 6037, near Davison, Mich. Union nut on boiler side of steam heat reducing valve pulled off account of spanner nut at connection to reducing valve being distorted and threads stripped; one injured.

February 16, 1934, locomotive 5634, near Vicksburg, Mich. Blower pipe connection at smoke box leaking account of defective check valve; one injured.

Three accidents; three injured.

**GREAT NORTHERN RAILWAY:**

July 14, 1933, locomotive 3344, near Holloway, Minn. Wrist pin came out of crosshead account of bolts breaking; wrist pin improper fit in outer wall of crosshead and 3 of the 4 studs securing wrist pin plate were defective; one injured.

December 4, 1933, locomotive 3388, Wagner, Mont. Power grate shaker lever connecting lock broke close to fusion welding that had been applied to improve the fit of the lock on lever; one injured.

\*April 22, 1934, locomotive 2049, Bison, Mont. Burned by hot grease which splashed out of cellar while giving attention to hot driving box; one injured.

\*May 11, 1934, locomotive 2575, Leonia, Idaho. Bolt came out of reverse gear causing sudden stop when attempt was made to use reverse gear; two injured.

\*\*June 4, 1934, locomotive 1165, Homestead, Mont. Water glass burst; water-glass connection developed a leak while en route, and water glass failed while employee was replacing water-glass guard after attempting repairs to connection; one injured.

Five accidents; six injured.

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

April 23, 1934, locomotive (A. T. & S. F.) 4051, Fort Worth, Tex. Injector steam pipe starting valve connecting nut leaking; one injured.

One accident; one injured.

**ILLINOIS CENTRAL RAILROAD:**

August 28, 1933, locomotive 3502, Markham, Ill. Cab apron badly worn; one injured.

September 6, 1933, locomotive 1926, Mount Pulaski, Ill. Injured while attempting to adjust bell ringer which was inoperative; ball rod too short in bell ringer crank box; cross arm on top of bell broken; thimble spring cotter missing and a nail used in place of cotter was turned up in a dangerous manner; one injured.

September 7, 1933, locomotive 1108, Tallulah, La. Uncoupling lever at rear of tender pulled out of socket in lock lifter fulcrum casting due to pin for securing lever in fulcrum casting dropping out; holes in casting and lever badly worn; one injured.

September 28, 1933, locomotive 1152, Asylum, Miss. Employee killed while attempting to line sand pipe with rail; clamp on sand pipe insufficient to hold pipe in its proper position; "R. F. sand pipe is loose" and "Tighten clamp to R. F. sand pipe" were reported on September 19, the last date the locomotive was in service prior to date of accident; one killed.

October 5, 1933, locomotive 2948, Dawson Springs, Ky. Employee's hand caught between edge of metal clothes-box door on tank and curtain strip on back wall of cab as locomotive passed around a curve; one injured.

November 8, 1933, locomotive 6009, Homewood, Ill. Water glass burst; injured while attempting to close water-glass cocks; one injured.



\*November 16, 1933, locomotive 239, McComb, Miss. Insufficient clearance between cab handhold and tender coal deck when locomotive moved on curve; one injured.

December 6, 1933, locomotive 1607, near Bluford, Ill. Burned by hot water which spurted from a hole in squirt pipe in cab; hole opened over a pit which had eaten from inside almost through the pipe; pipe heavily pitted on inside near the point of failure; one injured.

December 16, 1933, locomotive 277, Freeport, Ill. Slipped on cab deck apron; apron badly worn and not properly roughened; one injured.

January 3, 1934, locomotive 2455, Hayes, Ill. Water glass burst; injured while attempting to close water-glass cocks; water glasses reported 10 times during the month of December; one injured.

\*\*January 3, 1934, locomotive 2909, Dubuque, Iowa. Grate was difficult to operate, due to excessive lost motion in grate-shaker rigging and several grate fingers distorted account of having been overheated; one injured.

January 31, 1934, locomotive 2421, Memphis, Tenn. Water glass burst and the pressure of steam and water burst defective water-glass shield; one injured.

February 5, 1934, locomotive 3504, Chicago, Ill. Water glass burst; one injured.

March 10, 1934, locomotive 322, Louisville, Ky. Handwheel pulled off auxiliary throttle to air compressor, causing employee to fall from running board; threaded end of valve stem had been broken off, consequently nut for securing the wheel was missing; one injured.

April 6, 1934, locomotive 1870, DuQuoin, Ill. Blow-off cock pipe broke off through fusion weld and pipe pulled out of connection to gate valve and was hurled from the locomotive, striking two employees; blow-off cock pipe not properly clamped; one injured.

Fifteen accidents; 1 killed, 14 injured.

#### INTERNATIONAL-GREAT NORTHERN RAILROAD:

\*\*July 19, 1933, locomotive 338, Dean, Tex. Employee burned by hot water when he picked up squirt hose; steam throttle valve to cold-water sprinkler inspirator leaking; one injured.

February 25, 1934, locomotive (St. L. B. & M.) 1120, near Overton, Tex. Fire-door damper stud worked out; threads in boss on side of damper badly worn; one injured.

May 14, 1934, locomotive 1064, Kilgore, Tex. Crown sheet failure caused by overheating due to low water; one killed.

May 23, 1934, locomotive (M. P.) 1522, Troup, Tex. Air-operated bell ringer not properly adjusted, causing bell to revolve and entangle bell rope around bell crank and stand; one injured.

Four accidents; 1 killed, 3 injured.

#### LEHIGH VALLEY RAILROAD:

January 26, 1934, locomotive 316, Packerton, Pa. Air compressor throttle valve stem wheel came off, due to not being securely attached to stem; one injured.

February 16, 1934, locomotive 325, Leighton, Pa. Spring hanger broke, due to old fracture covering approximately 70 percent of cross-sectional area; one injured.

\*February 21, 1934, locomotive 3142, Athens, Pa. Operating wheel of steam valve to air pump came off when used as a handhold, causing employee to fall from running board; engineer went to front end to give attention to air pumps which were not maintaining necessary pressure and was cleaning pump screen when steam valve wheel gave way; screens on both pumps stopped up; one injured.

\*\*March 10, 1934, locomotive 4035, Mountain Top, Pa. Right main crank pin became overheated; grease cup plug and bushing blew out of rod cup after the contents of two torpedoes had been placed in rod cup in an attempt to lubricate the pin; defective condition of rods reported 8 times in the 7 days preceding the accident; one injured.

\*March 21, 1934, locomotive 5100, Penn Haven Junction, Pa. Water glass burst; one injured.

Five accidents; five injured.

#### LOUISIANA & ARKANSAS RAILWAY:

\*December 1, 1933, locomotive 93, Sibley, La. Employee fell when he attempted to mount locomotive footboard; footboard was defective; one injured. One accident; one injured.

#### LOUISVILLE & NASHVILLE RAILROAD:

\*\*August 11, 1933, locomotive (L. H. & St. L.) 84, Chiele, Ky. Tread on tender end sill step worn smooth; one injured.

January 15, 1934, locomotive 1352, Alnwick, Tenn. Reverse lever became disengaged from quadrant, due to worn teeth on reverse lever latch, and went violently to front end of quadrant; valve motion pin bushings were also worn; reverse lever became disengaged from quadrant on January 9 and was reported for repairs and was again reported on January 13; one injured.

February 27, 1934, locomotive 1518, Springfield, Tenn. Superheater flue broke off at safe end weld, due to having been overheated in welding; three injured.

Three accidents; five injured.

#### MICHIGAN CENTRAL RAILROAD:

July 9, 1933, locomotive 8225, Buffalo, N. Y. Centrifugal feed water pump burst due to high speed; control valve did not function properly account of accumulation of carbon; one injured.

July 21, 1933, locomotive (N. Y. C.) 5298, Buffalo, N. Y. Angle cock on rear of tender broke off, causing severe application of the brakes; brake pipe had previously broken off at angle cock and cock had been reapplied without rethreading the pipe; threads in angle cock were also defective; two injured.

\*\*October 7, 1933, locomotive 8945, Lawton, Mich. Coupler knuckle on locomotive opened, due to lower end of coupler lock striking extended floor on coupler pocket, and train parted, resulting in emergency application of the brakes; excessive wear in coupler radial pin and bushings and on coupler head support and radial extended floor on coupler pocket; one injured.

\*\*November 24, 1933, locomotive 8209, Albion, Mich. Power reverse gear stuck at center position, then suddenly released and went to extreme forward motion; employee's hand injured when he attempted to grasp the revolving wheel; one injured.

\*\*January 18, 1934, locomotive 7833, White Pigeon, Mich. Cab curtain strap broke; fabric strap was worn and defective; one injured.

Five accidents; six injured.

#### MISSISSIPPI CENTRAL RAILROAD:

\*\*November 14, 1933, locomotive 120, Hattiesburg, Miss. Fire hose burst; hose defective; one injured.

One accident; one injured.

#### MISSOURI-KANSAS-TEXAS LINES:

September 22, 1933, locomotive 63, Houston, Tex. Water glass burst; injured while closing water-glass cocks; one injured.

One accident; one injured.

#### MISSOURI PACIFIC RAILROAD:

\*August 30, 1933, locomotive 94, El Dorado, Ark. Insufficient clearance between throttle lever and water column clean-out plug; one injured.

October 20, 1933, locomotive 1303, Gale, Ill. Boiler check leaking; attempted to remove boiler check cap nut while under pressure and cap and check valve blew out; one injured.

\*\*December 27, 1933, locomotive 5339, Poplar Bluff, Mo. Cab handhold at gangway broke near bottom end, causing employee to fall from gangway step; one injured.

\*March 1, 1934, locomotive 1439, Dodson, Mo. Couplers between tender and first car slipped by; coupler on tender too low; two injured.

March 11, 1934, locomotive 1311, Dupo, Ill. Stay bolt blew out of inside throat sheet while being calked under steam pressure; threads on stay bolt defective; one injured.

May 12, 1934, locomotive 1432, near Delavan, Kans. Crown sheet failure caused by overheating due to low water; four injured.

Six accidents; 10 injured.

#### NASHVILLE, CHATTANOOGA & ST. LOUIS RAILWAY:

November 27, 1933, locomotive 628, Newsom, Tenn. Sand pipes stopped up; one injured.

March 12, 1934, locomotive 383, Chattanooga, Tenn. Conduit to rear headlight turned in clamp and coupling when used as a handhold, causing employee to

fall to the ground; vertical end of conduit so located as to be easily mistaken for handhold; one injured.

Two accidents; two injured.

#### NEW YORK CENTRAL—LINES EAST:

July 15, 1933, locomotive 2873, Akron, N. Y. Piston rod broke just inside crosshead fit, due to old fracture, knocking out front cylinder head and breaking discharge pipe from air compressor; one injured.

\*August 25, 1933, locomotive 2719, Schenectady, N. Y. Reverse lever stuck and while employee was attempting repairs lever flew back and struck him; radius bar pin had lost out; one injured.

February 16, 1934, locomotive 430, Buffalo, N. Y. Throttle stem packing blew out; throttle defects reported 25 times since December 27; one injured.

April 23, 1934, locomotive 2767, near Lyons, N. Y. Train line parted at Barco connection between locomotive and tender, causing emergency application of the brakes; Barco connection apparently not properly assembled; connection reported on April 11, 15, and 16; three injured.

\*\*June 6, 1934, locomotive 5344, Buffalo, N. Y. Engine truck brake shoe broke and a piece of same was thrown back into locomotive cab, striking engine-man in the face; one injured.

June 15, 1934, locomotive 5232, West Batavia, N. Y. Nut worked off clamp bolt to feed water pump delivery pipe and was thrown back through cab window, striking employee's eye; one injured.

Six accidents; eight injured.

#### NEW YORK CENTRAL—LINES WEST:

\*\*July 13, 1933, locomotive 2804, Perty, Ohio. Leading locomotive parted from second locomotive, causing sudden stop of train; one injured.

December 14, 1933, locomotive 2589, Elkhart, Ind. Flexible joint in brake pipe between locomotive and tender became disconnected, causing emergency application of the brakes; cotter key missing from brake pipe flexible joint nut; one injured.

Two accidents; two injured.

#### NEW YORK, CHICAGO & ST. LOUIS RAILROAD:

March 9, 1934, locomotive 482, Mulberry, Ind. Right steam pipe burst, causing back draft; approximately one-half of pipe wall for a distance of 40 inches blew out and was broken into many pieces; steam pipe cast thin on one side and numerous gas pockets in the failed portion; one injured.

One accident; one injured.

#### NEW YORK, NEW HAVEN & HARTFORD RAILROAD:

\*April 2, 1934, locomotive 2458, Bridgeport, Conn. Pet cock in boiler check broke off while being tightened; one injured.

One accident; one injured.

#### NEW YORK, ONTARIO & WESTERN RAILWAY:

November 14, 1933, locomotive 251, near Liberty, N. Y. Fire tube broke off at safe end weld near back flue sheet; metal at point of failure crystallized and apparently had been overheated; two injured.

May 21, 1934, locomotive 410, Campbell Hall, N. Y. Fire tube broke off at safe end weld; safe end reduced to approximately one sixty-fourth inch in thickness at point of failure; two injured.

Two accidents; four injured.

#### NORFOLK & WESTERN RAILWAY:

\*September 8, 1933, locomotive 464, Roanoke, Va. Insufficient clearance between cab apron and handhold located on front leg of tender; one injured.

February 9, 1934, locomotive 2012, near Salem, Va. Leading locomotive separated from second locomotive, account of lock block in coupler of second locomotive not properly engaging the coupler knuckle; rod connecting lock pin and lift lever was bent; one injured.

February 21, 1934, locomotive 2065, Waverly, Ohio. Emergency application of brakes, caused by failure of the flexible brake pipe connection between high and low pressure engines; the two vertical flexible brake pipe joints were inoperative, causing the sleeve section of vertical flexible joint to work out of manifold threads; one injured.

Three accidents; three injured.

#### NORTHERN PACIFIC RAILWAY:

September 15, 1933, locomotive 1781, Winston, Mont. Whistle bell became detached from whistle bowl due to center bolt working out of bowl; one injured.

June 11, 1934, locomotive 2218, Little Falls, Minn. Ash pan slides very difficult to operate, due to slide rod fouling on trailer-truck brake rigging; one injured.

Two accidents; two injured.

#### OREGON TRUNK RAILWAY:

February 5, 1934, locomotive (G. N.) 3117, near Nena, Oreg. Wrist pin worked out of crosshead, due to loss of wrist-pin keeper plate studs, resulting in front end of main rod being broken, after which it dropped to the ground and was forced back puncturing holes in the boiler sheets. The studs failed because of poor threads in stud holes in crosshead, undue stress placed on the studs by the working of wrist pin in crosshead, and the additional shocks and pounding to which the crosshead was subjected due to the piston rod working in the crosshead; 2 killed, 2 injured.

One accident; 2 killed, 2 injured.

#### PENNSYLVANIA RAILROAD:

July 22, 1933, locomotive 4301, Boyce, Pa. Reflex type water glass burst; lower water-glass cage clamp set screw not properly tightened; one injured.

\*August 17, 1933, locomotive 4336, East Altoona, Pa. Cab handhold fouled the top step, or deck, of tender when locomotive was moving on a curve, catching the hand of employee who was standing on gangway step; one injured.

August 28, 1933, locomotive 1334, Winans, Md. Air operating valve to fire door worked open, permitting fire door to close on fireman's hand; fire door reported on August 1, 3, 8, 21, 25, and 26; one injured.

December 28, 1933, locomotive 6245, Uniontown, Pa. Bell ringer failed; one injured.

January 10, 1934, locomotive 5363, near Hamlet, Ind. Steam-heat pipe became disconnected at L fitting adjacent to steam-heat throttle valve at turret; threads on steam-heat pipe badly worn and flat; steam-heat pipe connection reported leaking on January 2, 5 (2 times), 6, and 7; 2 injured.

January 17, 1934, locomotive 4003, Dalmatia, Pa. Main rod strap bolt broke through old fracture at root of first thread; head of bolt badly mutilated and distorted; brasses and block in front of main rod were loose and working in strap and rods were pounding; inspection reports show that defective condition of main rods had existed for some time, and if proper attention had been given to the defects reported on January 16 this accident might have been avoided; one injured.

February 19, 1934, locomotive 3867, Conemaugh, Pa. Air compressor failed; compressor reported on January 30, February 2 and 14; one injured.

March 23, 1934, locomotive 6744, Enola, Pa. Insufficient clearance around reverse gear operating wheel; one injured.

June 9, 1934, locomotive 3833, Baltimore, Md. Reverse lever unlatched and flew back, striking engineer; reverse lever latch improper fit in quadrant; excessive lost motion in lifting rods and pins; one injured.

Nine accidents; 10 injured.

#### PERE MARQUETTE RAILWAY:

July 19, 1933, locomotive 512, near Eagle, Mich. Superheater tube collapsed and pulled apart at fusion welded safe end seam near back flue sheet, due to being badly burned; from back flue sheet for a distance of about 6 feet the tubes were encased in a solid bank of mud and scale; 2 injured.

March 19, 1934, locomotive 1110, Clyde, Mich. Injured while replacing main rod grease cup plug after applying additional grease account of main rod running hot; main rod reported running hot on March 17 and 18 (2 times); 1 injured.

Two accidents; three injured.

#### READING COMPANY:

\*\*February 11, 1934, locomotive 1922, near Dunellen, N. J. Sprinkler hose pipe broke off; one injured.

March 24, 1934, locomotive 1911, Glenlake, Pa. Injured while attempting to operate reverse gear; reverse lever reach rod binding hard on outside edge of a slot cut in running board, causing reverse gear to be very difficult to operate; reverse gear reported on February 12, 13, 15, 22, 24, March 3, 4, 7, 9, 12, 16, 17 (2 times), 19, and 23; also on March 24 and 26, after the accident; 1 injured.

Two accidents; two injured.

## RICHMOND, FREDERICKSBURG &amp; POTOMAC RAILROAD:

\*November 7, 1933, locomotive 404, Coal Spring, Va. Burned by hot grease which blew out of driving-box cellar due to driving box being very hot; one injured.

\*\*February 25, 1934, locomotive 102, Richmond, Va. Nipple connecting steam-heat pipe to valve and hose at rear of tender blew out; threads on pipe nipple defective; one injured.

Two accidents; two injured.

## RUTLAND RAILROAD:

July 4, 1933, locomotive 101, Rutland, Vt. Fire hose burst; hose defective; one injured.

One accident; one injured.

## ST. LOUIS-SAN FRANCISCO RAILWAY:

\*\*January 30, 1934, locomotive 3743, Memphis, Tenn. Grate shaker bar slipped off lever; latch securing drop grate lever in position was so constructed and applied that it could not be unlatched without raising the shaker bar up on the lever; one injured.

\*February 1, 1934, locomotive 3707, Pensacola, Fla. Reverse lever kicked back to corner and jammed employee's elbow against back of cab; reverse lever in back motion had less than 2-inch clearance with cab; 1 injured.

\*February 24, 1934, locomotive 1338, Thayer, Mo. Cab apron raised and caught employee's foot; bolt in top step worked up, preventing apron from passing over; one injured.

\*\*March 22, 1934, locomotive 965, Springfield, Mo. Release valve on right steam chest became locked in open position; lock on release valve improperly adjusted; one injured.

May 23, 1934, locomotive 3545, Birmingham, Ala. Driving spring broke allowing front footboard to drop down on street crossing; 6 of the 14 leaves of driving spring were broken previous to the time of this accident; one injured.

June 27, 1934, locomotive 4125, Chelsea, Okla. Main air reservoir exploded; one injured.

Six accidents; six injured.

## ST. LOUIS SOUTHWESTERN RAILWAY:

July 5, 1933, locomotive 605, Kress City, Ark. Nut connecting steam heat pipe to governor failed account of badly worn threads in nut and on governor; one injured.

\*September 23, 1933, locomotive 805, Stephens, Ark. Damper chain broke; one injured.

\*January 15, 1934, locomotive 780, Ilmo, Mo. Locomotive 780 uncoupled from locomotive 585, causing emergency application of the brakes; one injured.

February 15, 1934, locomotive 195, Hamilton, Tex. Boiler check valve seat blew out of valve body; one injured.

Four accidents; four injured.

## SEABOARD AIR LINE RAILWAY:

January 14, 1934, locomotive 911, Raleigh, N. C. Throttle lever moved back out of quadrant and dropped off end of rest, due to stop in back of rest being missing, and locomotive moved uncontrolled until it collided with a cut of cars; one injured.

February 22, 1934, locomotive 270, Estill, S. C. Bell cord broke; cord defective; one injured.

March 28, 1934, locomotive 264, Norlina, N. C. Fell from locomotive while attempting to open train heater valve at manifold; heater valve could not be opened by means of the extension handle in cab; one injured.

\*April 14, 1934, locomotive 521, Cedartown, Ga. Main crank pin failed at hub fit fillet through old fracture which extended approximately 75 percent of cross-sectional area of pin; one injured.

Four accidents; four injured.

## SOUTHERN RAILWAY:

October 10, 1933, locomotive 1586, Mobile, Ala. Fire hose burst; hose defective; two injured.

October 11, 1933, locomotive 708, Littleton, Ala. Plug left out of blow-off line after boiler wash and hot water escaping from pipe scalded employee when he attempted to blow out the ash pan; one injured.

\*\*January 29, 1934, locomotive 4878, Spencer, N. C. While slack wedge spring between locomotive and tender was being tightened the bolt securing spring rod to wedge broke, permitting the spring and spring rod to fly out and strike employee; bolt not of sufficient strength and had old 25 percent fracture; one injured.

February 1, 1934, locomotive 795, Williamson, Ga. Burned by escaping steam and hot water while attempting to operate ash pan blower; plug had been left out or improperly applied in T fitting in ash pan blower pipe; one injured.

\*\*May 19, 1934, locomotive 4755, Robious, Va. Valve chamber inspection plug blew out; escaping steam broke windows in passing train; one injured.

Five accidents; six injured.

## SOUTHERN PACIFIC—LINES EAST:

July 5, 1933, locomotive (T. & N. O.) 62, Morgan City, La. Blow-off cock stem leaking; one injured.

One accident; one injured.

## SOUTHERN PACIFIC—LINES WEST:

\*\*July 24, 1933, locomotive 1123, El Centro, Calif. Nozzle blew out of fire hose due to not being securely clamped; one injured.

\*October 30, 1933, locomotive 3718, Fenelon, Nev. Eccentric rod broke, due to old fracture; one injured.

May 18, 1934, locomotive 2827, McMinnville, Oreg. While oiling link motion, engineer's hand was scalded by steam and hot water discharged by automatic drain valve in steam pipe to feed water pump; drain pipe too short and improperly located; one injured.

\*June 5, 1934, locomotive 2301, Hazen, Nev. Side rod broke; one injured.

Four accidents; four injured.

## SPOKANE, PORTLAND &amp; SEATTLE RAILWAY:

June 7, 1934, locomotive 370, Portland, Oreg. Defective fusion weld in fire door flange failed while being calked under steam pressure; one injured.

One accident; one injured.

## TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS:

\*\*December 25, 1933, locomotive 325, St. Louis, Mo. Fell from top of tender due to insecure footing and absence of handrail along the side of coal bunker; one injured.

\*\*January 10, 1934, locomotive 311, East St. Louis, Ill. Fell from top of tender due to absence of handrail on side of coal bunker; one injured.

Two accidents; two injured.

## TOLEDO, PEORIA &amp; WESTERN RAILROAD:

March 9, 1934, locomotive 61, Hamilton, Ill. Tank hose burst; one injured.

One accident; one injured.

## UNION PACIFIC RAILROAD:

\*August 28, 1933, locomotive 5037, Fremont, Nebr. Steam heat hose on rear of tender, which was hanging down, struck cross rail of a railroad crossing and was thrown upward, striking and uncoupling air hose connection between tender and first car. The sudden application of brakes resulted in the fatal injury of an employee who died 4 days later; 1 injured.

\*\*August 31, 1933, locomotive 1926, Omaha, Nebr. Coupler key at rear of tender broke; one injured.

October 20, 1933, locomotive (O. S. L.) 4742, Salt Lake City, Utah. Sleeve and plug used to cap unused blow-off discharge pipe blew off; threads on pipe destroyed by corrosion; one injured.

June 28, 1934, locomotive 9086, Peru, Wyo. Main rod strap broke through old fracture in top section; rod running hot and pounding; rod reported pounding on June 16, 17, and 23; one injured.

Four accidents; four injured.

## WABASH RAILWAY:

\*July 28, 1933, locomotive 2916, Taylorville, Ill. Bolt holding key block in back end of main rod broke, causing crank arm to come off; one injured.

\*\*September 10, 1933, locomotive 683, near Moberly, Mo. Pin connecting fire door air cylinder piston to fulcrum lever worked out of pinhole, allowing fulcrum lever to disconnect from piston; key for locking pin in place was distorted

and slot in pin for the key had accumulation of grease and coal dust which prevented key from dropping down properly; one injured.

October 11, 1933, locomotive 2323, Landers, Ill. Boiler check stuck open; one injured.

\*\*November 11, 1933, locomotive 2910, Bement, Ill. Main rod brass broke, due to bearing running hot; one injured.

June 6, 1934, locomotive 2900, Decatur, Ill. Cab apron improperly applied; one injured.

Five accidents; five injured.

**WESTERN MARYLAND RAILWAY:**

May 7, 1934, locomotive 1120, Cumberland, Md. Rain spout at top of cab window gave way when used as a handhold as employee attempted to go from cab window to running board; no other handhold provided; one injured.

One accident; one injured.

**ACCIDENTS AND CASUALTIES RESULTING FROM THE FAILURE OF  
LOCOMOTIVES OTHER THAN STEAM AND THEIR APPURTENANCES  
DURING THE FISCAL YEAR ENDED JUNE 30, 1934, BY ROADS**

**LONG ISLAND RAILROAD:**

October 2, 1933, locomotive unit 320, Morris Park, N.Y. Employee burned when a severe arc occurred within locomotive cab near main and battery fuse boxes; apparently arc was caused by failure of insulation at main or battery fuse box; both boxes so badly damaged that their condition prior to accident could not be determined; one injured.

One accident; one injured.

TABLE XII.—Number of steam locomotives inspected,

	Akron, Canton & Youngstown	Alabama, Tennessee & Northern	Aliquippa & Southern	Alton	Ann Arbor	Ashokan, Topeka & Santa Fe	Atlanta & West Point	Atlanta, Birmingham & Coast	Atlantic & Yadkin	Atlantic Coast Line	Baltimore & Ohio, lines east
1 Air compressors.....						21				2	14
2 Arch tubes.....						1					14
3 Ash pans and mechanism.....											3
4 Axles.....											4
5 Blow-off cocks.....		1				15					4
6 Boiler checks.....				2		4				2	10
7 Boiler shell.....						1	2				9
8 Brake equipment.....					1	61	1			21	102
9 Cabs, cab windows, and curtains.....						9				4	55
10 Cab aprons and decks.....						19					18
11 Cab cards.....			1			1					1
12 Coupling and uncoupling devices.....											1
13 Crossheads, guides, pistons, and piston rods.....			1			19		2		4	97
14 Crown bolts.....										7	4
15 Cylinders, saddles, and steam chests.....				1		43	2			7	70
16 Cylinder cocks and rigging.....						16	2			1	15
17 Domes and dome caps.....						1					10
18 Draft gear.....						5					12
19 Draw gear.....				1		4				5	17
20 Driving boxes, shoes, wedges, pedestals, and braces.....		1				29		6		7	108
21 Fire-box sheets.....						1	1			2	3
22 Flues.....						8				2	5
23 Frames, tailpieces, and braces, locomotive.....						11		4		7	65
24 Frames, tender.....						12					9
25 Gages and gage fittings, air.....						13					9
26 Gages and gage fittings, steam.....						11					12
27 Gage cocks.....						11				7	22
28 Grate shakers and fire doors.....						9					8
29 Handholds.....						6					5
30 Injectors, inoperative.....						1					1
31 Injectors and connections.....					2	49		1		15	45
32 Inspections and tests not made as required.....	4	6	1	5		278	4	6		64	268
33 Lateral motion.....						12	1			4	27
34 Lights, cab and classification.....						2				1	9
35 Lights, headlight.....	1					10					9
36 Lubricators and shields.....						6				5	14
37 Mud rings.....						9				5	15
38 Packing nuts.....						25					6
39 Packing, piston rod and valve stem.....			1			8					48
40 Pilot and pilot beams.....				1		3				1	3
41 Plugs and studs.....						7					16
42 Reversing gear.....	1			1		3				6	36
43 Rods, main and side, crank pins, and collars.....						39				6	102
44 Safety valves.....						10					9
45 Sanders.....						68	7	6		32	216
46 Springs and spring rigging.....	1	3				3					3
47 Squirt hose.....						5				2	14
48 Stay bolts.....	1					4	4			2	13
49 Stay bolts, broken.....		6				9				1	15
50 Steam pipes.....					1	4	1				2
51 Steam valves.....						19				6	13
52 Steps.....				1	1	20	1			22	42
53 Tanks and tank valves.....						7		1			1
54 Telltale holes.....						21				1	22
55 Throttle and throttle rigging.....	1					23				17	23
56 Trucks, engine and trailing.....		1				25		1		8	21
57 Trucks, tender.....	8					53				13	77
58 Valve motion.....		2				30					18
59 Washout plugs.....	1										1
60 Train-control equipment.....						9	1			5	35
61 Water glasses, fittings, and shields.....						7				7	53
62 Wheels.....						11				3	26
63 Miscellaneous—Signal appliances, badge plates, brakes (hand).....											
Number of defects.....	18	21	6	17		1,119	28	35		305	1,904
Locomotives reported.....	23	15	20	185	50	1,839	53	80	16	868	2,348
Locomotives inspected.....	38	19	29	461	136	3,056	81	186	20	1,549	2,798
Locomotives defective.....	4	6	1	6		337	6	8		152	356
Percentage of inspected found defective.....	11	32	3.4	1.3		11	7	4.3		10	13
Locomotives ordered out of service.....		1				9	1			4	30

found defective, and ordered from service, etc.

Baltimore & Ohio, lines west	Bangor & Aroostook	Belt Railway of Chicago	Bessemer & Lake Erie	Birmingham Southern	Boston & Albany	Boston & Maine	Buffalo Creek	Burlington-Rock Island	Camas Prairie	Canadian National	Canadian Pacific	Carolina & North-western	Central of Georgia	Central R. of New Jersey	Central Vermont	Charleston & Western Carolina	Chesapeake & Ohio	Chicago & Eastern Illinois	Chicago & Illinois Midland	Chicago & North Western	Chicago & Western Indiana	Chicago & Burlington & Quincy	Chicago Great Western
13			2		1	3			1	1	2	1		3	1		2	4		16		12	12
16															1								
7																							
6	1	2											1	9						9		4	1
3		2	1		1					1	1		1							2		2	2
4																							
42	2	2	2		10	15				2	9	4	1	26	2	1		10	14	85	15	26	37
46	1	3	3		10	7				2	4	1	1	11	11			10	14	16	13	17	
7		1				4				1				1						5	6	6	9
2					1						4									1		2	12
10						1																9	10
2																						23	13
10	3	7			5	5		3	1	2			3	7	1	1	9	3		30	1	9	23
2																						1	14
2																							15
36	9	3			1	4				2				14	1	1	32	15		50	7	21	62
14	2	4																15	12	55	1	15	38
2																							
2																							
11	2	1				1								4	1		4	1		11		1	17
25	14	6				14				5	2	2		7	7		16	5		60	2	29	36
3						3								5			17	2		2		2	22
15	1					3		5	4	1	1	1	2	9	1	3	7			32		8	17
2																							
4	3	1								2				2			5			4		1	3
9	1	1												1			1			6		3	26
1																				1			
8	2	4				4								3			3	4		16		5	8
3														8			6			8		5	29
25	3	2			4	8				3	6		2	9	2	21	9			29	2	30	26
133	5	13	16		38	84	1	3	24	10	17	4	23	76	18	13	120	67		215	1	105	117
7						4								9	5					8		4	33
6		3				1		3						2			1			2		4	34
6														4									
3		4				1	1							1						3		1	35
5	2	2												1						2		3	36
23	10	1				2								10			17	25		45	4	14	7
2		4				2														3		2	40
3		1				2								3			4			9		1	41
15		1																					

TABLE XII.—Number of steam locomotives inspected,

Parts defective, inoperative or missing, or in violation of the rules	Chicago, Indianapolis & Louisville	Chicago, Milwaukee, St. Paul & Pacific	Chicago River & Indiana	Chicago, Rock Island & Pacific	Chicago, St. Paul, Minneapolis & Omaha	Chicago Short Line	Chicago, West Pullman & Southern	Cincinnati Union Terminal	Cleveland, Cincinnati, Chicago & St. Louis	Clinchfield	Colorado & Southern
1 Air compressors	3	4	1	27	2				5	3	2
2 Arch tubes	4			5	4						
3 Ash pans and mechanism	1			3					1		1
4 Axles											
5 Blow-off cocks	3	1		24					3		1
6 Boiler checks	1			10			1		5		1
7 Boiler shell	17	10		12					4		1
8 Brake equipment	9	29		95	22				9	11	10
9 Cabs, cab windows, and curtains	4	2		38	2	1			11	4	21
10 Cab aprons and decks	9	7		8	2				6	3	
11 Cab cards	4			9					1		
12 Coupling and uncoupling devices		1		1							1
13 Crossheads, guides, pistons, and piston rods	8	11	5	39	3				7	10	6
14 Crown bolts		1		1					1		
15 Cylinders, saddles, and steam chests	7	32		28	3	3			19	12	18
16 Cylinder cocks and rigging	3	23	2	20	4	3			14	2	1
17 Domes and dome caps	1		1								
18 Draft gear	1	5		7	2				3	2	3
19 Draw gear	2	2		18	1				3	1	
20 Driving boxes, shoes, wedges, pedestals, and braces	15	23	1	36	8		2		18	10	27
21 Fire-box sheets	3	10		10					2	2	2
22 Flues		6		6					2	1	
23 Frames, tailpieces, and braces, locomotive	7	21		25	1				9	11	5
24 Frames, tender		6		1					1		
25 Gages and gage fittings, air		2	1	7	1				1		
26 Gages and gage fittings, steam	2	1	1	8	2				3	2	
27 Gage cocks		5		12	3				4	1	4
28 Grate shakers and fire doors	3	5		20	1				4	1	1
29 Handholds	1	6		12	6				2	2	2
30 Injectors, inoperative	1	1		4							
31 Injectors and connections	4	8	1	52	3	1			11	3	10
32 Inspections and tests not made as required	49	104		265	41	1	1		117	29	42
33 Lateral motion	1	2		12	2	1			1	4	3
34 Lights, cab and classification		2		7	1						
35 Lights, headlights	1	11		10	2				3		
36 Lubricators and shields	1	2		7	1				3		2
37 Mud rings			1	4	1		1			3	
38 Packing nuts	3	9		11	4	1			7	3	3
39 Packing, piston rod and valve stem	3	12	7	14	3				8	6	8
40 Pilot and pilot beams		2		6	3						5
41 Plugs and studs	1	4		8					3	1	
42 Reversing gear	4	3		8							
43 Rods, main and side, crank pins, and collars	4	17	1	59	7				12	18	8
44 Safety valves	1	1		11	1						
45 Sanders	1	11		18	2				3	1	2
46 Springs and spring rigging	21	57		82	13				24	30	6
47 Squirt hose		3		2	1						
48 Stay bolts		1		5					3	1	1
49 Stay bolts, broken		10		10							
50 Steam pipes	3	10		17	2				25	1	
51 Steam valves		5		7					8	1	1
52 Steps	3	4		10	6				1	5	5
53 Tanks and tank valves	2	12		18	4				6	3	1
54 Telltale holes		2		2							
55 Throttle and throttle rigging	3	7	2	10		1	1		5	2	1
56 Trucks, engine and trailing	15	5		20	8				7	9	14
57 Trucks, tender	3	6		17	7				4		12
58 Valve motion	2	12	3	16	2		1		9	4	5
59 Washout plugs	4	6		9					18		3
60 Train-control equipment											
61 Water glasses, fittings, and shields	3	9	5	37					13	1	5
62 Wheels	7	13		21	4				2	1	5
63 Miscellaneous—Signal appliances, badge plates, brakes (hand)	3	9		12	1				8	2	1
<b>Number of defects</b>	<b>237</b>	<b>551</b>	<b>32</b>	<b>1,276</b>	<b>188</b>	<b>12</b>	<b>7</b>		<b>441</b>	<b>208</b>	<b>251</b>
Locomotives reported	173	1,647	66	1,435	295	10	12	12	718	86	125
Locomotives inspected	312	2,616	34	2,502	545	21	16	16	1,138	118	224
Locomotives defective	62	154	8	347	55	6	2		122	33	54
Percentage of inspected found defective	20	6	24	14	10	29	12		11	28	24
Locomotives ordered out of service	3	1		28	2				10	3	2

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

Colorado & Wyoming	Columbus & Greenville	Conemaugh & Black Lick	Copper Range	Cumberland & Pennsylvania	Davenport, Rock Island & Northwestern	Delaware & Hudson	Delaware, Lackawanna & Western	Denver & Rio Grande Western	Denver & Salt Lake	Detroit & Mackinac	Detroit & Toledo Shore Line	Detroit Terminal	Detroit, Toledo & Iron-ton	Donora Southern	Duluth & Northeastern	Duluth, Missabe & Northern	Duluth, South Shore & Atlantic	East Broad Top Railroad & Coal	East St. Louis Junction	East Tennessee & Western North Carolina	Elgin, Joliet & Eastern	Erie	Florida East Coast	Fort Smith & Western	Fort Worth & Denver City		
							1	8	4			1	3	1						1		2	15		1	2	
								2															2				1
								1														1	7				4
								3														1	9				5
								5														2	15				6
								1														1	9				7
								45														1	4				8
								50														1	50				5
								7														1	12				3
								1														2	6				9
								1														1	1				10
								2														2	6				11
								1														1	1				12
								2														2	1				13
								11														2	4				14
								8														8	27				15
								1														2	3				16
								3														2	2				17
								16														9	9				18
								11														6	6				19
								2														1	5				20
								21														3	9				21
								1														4	4				22
								25														11	1				23
								1														1	1				24
								2														1	4				25
								14														8	8				26
								5														5	5				27
								22														6	8				28
								1														7	7				29
								2														2	1				30
								35														1	5				31
								123														9	3				32
								18														5	15				33
								8														1	1				34
								7														1	1				35
								12														2	5				36
								4														1	1				37
								1														1	1				38
								9														5	7				39
								6														3	8				40
								4														2	6				41
								9														1	5				42
								1														1	1				43
								4														3	5				44
								1														1	1				45
								1														1	1				46
								1														1	1				47
								1														1	1				48
								1														1	1				49</





TABLE XII.—Number of steam locomotives inspected,

Parts defective, inoperative or missing, or in violation of the rules		McCloud River Macon, Dublin & Savannah	Maine Central	Maine & Northeastern	Maryland & Pennsylvania	Michigan Central	Midland Valley	Minneapolis & St. Louis	Minneapolis, Northfield & Southern	Minneapolis, St. Paul & S. S. Marie	Minnesota, Dakota & Western	Minnesota Transfer	
1	Air compressors.....		2			14				4			
2	Arch tubes.....									1			
3	Ash pans and mechanism.....												
4	Axles.....		1		1	2		4		3		1	
5	Blow-off cocks.....		3			5							
6	Boiler checks.....		3			4							
7	Boiler shell.....		6	1		7		6	4	16		1	
8	Brake equipment.....		12	1		11		14	1	1			
9	Cabs, cab windows, and curtains.....		1			1		1	4	4			
10	Cab aprons and decks.....		1			1		1	4	4			
11	Cab cards.....		1										
12	Coupling and uncoupling devices.....		15	3		6		4	2	2			
13	Crossheads, guides, pistons, and piston rods.....		3			4							
14	Crown bolts.....		4			5							
15	Cylinders, saddles, and steam chests.....		1			1							
16	Cylinder cocks and rigging.....		4			5							
17	Domes and dome caps.....		3			3							
18	Draft gear.....		3			7		3	1	7			
19	Draw gear.....		10	1		4		4	4	4			
20	Driving boxes, shoes, wedges, pedestals, and braces.....		2	1		4		2	2	3			
21	Fire-box sheets.....		1	2		1		3	3	3			
22	Flues.....		1			1		2	4	4			
23	Frames, tailpieces, and braces, locomotive.....		4			1		1	1	1			
24	Frames, tender.....		1			2		2	2	2			
25	Gages and gage fittings, air.....		1			5		2	2	2			
26	Gages and gage fittings, steam.....		1			2		2	2	2			
27	Gage cocks.....		1	1		2		2	2	2			
28	Grate shakers and fire doors.....		1			2		2	2	2			
29	Handholds.....		3			18		5	5	6			
30	Injectors, inoperative.....		6	4		4		6	6	6			
31	Injectors and connections.....		37	2		59		76	5	47		4	
32	Inspections and tests not made as required.....					1		1		2			
33	Lateral motion.....		1			1		4	4	4			
34	Lights, cab and classification.....		2	2		2		2	2	2			
35	Lights, headlights.....		2	2		2		2	2	2			
36	Lubricators and shields.....		2	2		2		2	2	2			
37	Mud rings.....		2	2		17		2	2	2			
38	Packing nuts.....		2	5		3		3	3	3			
39	Packing, piston rod and valve stem.....		1	1		1		1	1	1			
40	Pilot and pilot beams.....		1	1		1		1	1	1			
41	Plugs and studs.....		2	2		2		2	2	2			
42	Reversing gear.....		4	1		6		6	4	7			
43	Rods, main and side, crank pins, and collars.....		1			1		1	1	1			
44	Safety valves.....		4	11		20		21	4	27		1	
45	Sanders.....		1			5		5	5	5			
46	Springs and spring rigging.....		1			2		2	2	2			
47	Squirt hose.....		1			4		4	4	4			
48	Stay bolts.....		1	1		1		1	1	1			
49	Stay bolts, broken.....		1	2		1		1	1	1			
50	Steam pipes.....		2			5		5	5	5			
51	Steam valves.....		1			10		3	3	3		1	
52	Steps.....		1			9		4	4	4		1	
53	Tanks and tank valves.....		1			1		1	1	1		1	
54	Telltale holes.....		1			8		5	5	5			
55	Throttle and throttle rigging.....		8	5		4		1	12	13		1	
56	Trucks, engine and trailing.....					10		6	13	13			
57	Trucks, tender.....		9			2		1	1	1			
58	Valve motion.....					8		5	2	2			
59	Washout plugs.....					1		1	1	1			
60	Train-control equipment.....					19		6	1	9			
61	Water glasses, fittings, and shields.....		5			5		4	4	4			
62	Wheels.....		2			6		1	2	2			
63	Miscellaneous—Signal appliances, badge plates, brakes (hand).....		2	1		6		1	4	4			
Number of defects.....		38	150	40	3338	234	20	226	1	10			
Locomotives reported.....		13	13	218	10	14	475	17	197	11	345	10	20
Locomotives inspected.....			66	295	17	23	577	69	314	20	791	9	45
Locomotives defective.....			10	48	8	1	76	7	79	5	59	1	4
Percentage of inspected found defective.....			15	16	47	4.3	13	25	25	7	11	9	
Locomotives ordered out of service.....			1	6				8		3			

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

Mississippi Central	Missouri & North Arkansas	Missouri-Illinois	Missouri-Kansas-Texas	Missouri Pacific	Mobile & Ohio	Monongahela Connecting	Monongahela	Montour	Montpelier & Wells River	Nashville, Chattanooga & St. Louis	Nevada Northern	Newburgh & South Shore	New Orleans Great Northern	New Orleans Public Belt	New York Central, lines east	New York Central, lines west	New York, Chicago & St. Louis	New York, New Haven & Hartford	New York, Ontario & Western	Norfolk & Portsmouth Belt	Norfolk & Western	Norfolk Southern	Northern Pacific	Northern Term.
4	2	3	6	3	6					2				22	31	8					1	42	1	
2	3	5	4	4	4					3				1	4	2	3	1			1	20	4	2
7	1	1	1	1	1					2				1	9	9	9	5	3		3	11	7	7
12	1	1	1	1	1					7				1	27	27	26	1			1	16	8	4
16	1	1	1	1	1					16				1	17	17	17	5	5		3	11	7	7
17	1	1	1	1	1					7				1	33	33	33	9	9		4	143	10	10
18	1	1	1	1	1					8				1	13	26	24	11	6		3	63	9	9
22	1	1	1	1	1					1				1	8	6	1	3			3	5	10	10
23	1	1	1	1	1					2				1	4	8	2	2			1	5	11	11
24	1	1	1	1	1					2				1	1	1	1	2			1	1	12	12
25	1	1	1	1	1					2				14	16	24	9	6			3	25	13	13
26	1	1	1	1	1					14				10	47	36	4	1			16	2	10	15
27	1	1	1	1	1					1				3	32	25					2	2	16	16
28	1	1	1	1	1					29				4	6	6	1	1			2	1	17	17
29	1	1	1	1	1					1				1	14	14	5	5			1	5	19	19
30	1	1	1	1	1					1				1	15	15	7	7			2	1	18	18
31	1	1	1	1	1					2				1	20	21	3	3			1	4	20	20
32	1	1	1	1	1					2				3	3	3	3	5	5		2	1	21	21
33	1	1	1	1	1					2				3	3	3	3	7	7		1	1	22	22
34	1	1	1	1	1					6				4	17	17	5	5			9	2	23	23
35	1	1	1	1	1					6				4	3	3	3	1	1		3	7	24	24
36	1	1	1	1	1					6				4	3	3	3	1	1		3	7	25	25
37	1	1	1	1	1					6				4	3	3	3	1	1		3	7	26	26
38	1	1	1	1	1					6				4	3	3	3	1	1		3	7	27	27
39	1	1	1	1	1					6				4	3	3	3	1	1		3	7	28	28
40	1	1	1	1	1					6				4	3	3	3	1	1		3	7	29	29
41	1	1	1	1	1					6				4	3	3	3	1	1		3	7	30	30
42	1	1	1	1	1					6				4	3	3	3	1	1		3	7	31	31
43	1	1	1	1	1					6				4	3	3	3	1	1		3	7	32	32
44	1	1	1	1	1					6				4	3	3	3	1	1		3	7	33	33
45	1	1	1	1	1					6				4	3	3	3	1	1		3	7	34	34
46	1	1	1	1	1					6				4	3	3	3	1	1		3	7	35	35
47	1	1	1	1	1					6				4	3	3	3	1	1		3	7	36	36
48	1	1	1	1	1					6				4	3	3	3	1	1		3	7	37	37
49	1	1	1	1	1					6				4	3	3	3	1	1		3	7	38	38
50	1	1	1	1	1					6				4	3	3	3	1	1		3	7	39	39
51	1	1	1	1	1					6				4	3	3	3	1	1		3	7	40	40
52	1	1	1	1	1					6				4	3	3	3	1	1		3	7	41	41
53	1	1	1	1	1					6				4	3	3	3	1	1		3	7	42	42
54	1	1	1	1	1					6				4	3	3	3	1	1		3	7	43	43
55	1	1	1	1	1					6				4	3	3	3	1	1		3	7	44	44
56	1	1	1	1	1					6				4	3	3	3	1	1		3	7	45	45
57	1	1	1	1	1					6				4	3	3	3	1	1		3	7	46	46
58	1	1	1	1	1					6				4	3									





TABLE XII.—Number of steam locomotives inspected,

Parts defective, inoperative or missing, or in violation of the rules		Southern	Spokane International	Spokane, Portland & Seattle	Steelton & Highspire	Tennessee, Alabama & Georgia	Tennessee Central	Tennessee Coal, Iron & R. R.	Terminal R. R. Assn. of St. Louis	Texas & Pacific	Texas-Mexican
1	Air compressors	17	8				3			2	
2	Arch tubes	1									
3	Ash pans and mechanism	3	3				2				
4	Axles						1				
5	Blow-off cocks		5				4			1	
6	Boiler checks	8	2				2	2			
7	Boiler shell	12	2				2	1		4	
8	Brake equipment	69	22				15	11	10		
9	Cabs, cab windows, and curtains	66	8				2	9	1	1	
10	Cab aprons and decks	5	5								
11	Cab cards	1					1			1	
12	Coupling and uncoupling devices	3								1	
13	Crossheads, guides, pistons, and piston rods	59	14				11			1	
14	Crown bolts	2	2								
15	Cylinders, saddles, and steam chests	116	3	3			14	1	4		
16	Cylinder cocks and rigging	23	2	2			1	5	1	2	
17	Domes and dome caps	2					8				
18	Draft gear	12	3				1	3			
19	Draw gear	18	3				2	3	3		
20	Driving boxes, shoes, wedges, pedestals, and braces	94	19				20		12		
21	Fire-box sheets	9	11				3	1	2	2	
22	Flues	6	5				7	1	1		
23	Frames, tailpieces, and braces, locomotive	136	6				14	2	3		
24	Frames, tender	5									
25	Gages and gage fittings, air	4					1		4		
26	Gages and gage fittings, steam	12	3				2		7		
27	Gage cocks	10	4				11		6	7	
28	Grate shakers and fire doors	8	5								
29	Handholds	12	9					2			
30	Injectors, inoperative	1						1			
31	Injectors and connections	42	21	4			14	5	11	1	
32	Inspections and tests not made as required	194	3	69	4	2	48	53	51	4	
33	Lateral motion	24	6				3		2		
34	Lights, cab and classification	2									
35	Lights, headlights	4						1			
36	Lubricators and shields	4	3				8		2		
37	Mud rings	9	3				9		3		
38	Packing nuts	5	2	1			5	10	1		
39	Packing, piston rod and valve stem	15	3	3			2	2	15		
40	Pilot and pilot beams	5	2						1		
41	Plugs and studs	1	2	1			1				
42	Reversing gear	15	2				1		4	1	
43	Rods, main and side, crank pins, and collars	52	15				16	5	5	1	
44	Safety valves	1	1					1			
45	Sanders	10	10					9			
46	Springs and spring rigging	138	2				15	8	5		
47	Squirt hose	6	1				1				
48	Stay bolts	5	1				7	1	2	1	
49	Stay bolts, broken	10									
50	Steam pipes	7					2	3	6		
51	Steam valves	8	1				1		2		
52	Steps	17	10				1	2	2	2	
53	Tanks and tank valves	36	19				7		5		
54	Telltale holes										
55	Throttle and throttle rigging	20	6				3	1	3	3	
56	Trucks, engine and trailing	47	3				15		3	3	
57	Trucks, tender	23	1	4			7		3	1	
58	Valve motion	29	3				6		9		
59	Washout plugs	20	2				25				
60	Train-control equipment	2									
61	Water glasses, fittings, and shields	17	5				8	2	3	2	1
62	Wheels	23	1				1	6	10		
63	Miscellaneous—Signal appliances, badge plates, brakes (hand).	20	9				1		2	2	
Number of defects		1,524	8,370	18	4	333	8	154	212	14	
Locomotives reported		2,041	11,102	13	10	37	56	134	347	17	
Locomotives inspected		3,269	33,171	17	168	22	189	591	18		
Locomotives defective		295	3,754	2	64	4	60	58	4		
Percentage of inspected found defective		9	9	38	24	11	38	18	32	10	22
Locomotives ordered out of service		33	6				11		8		

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

Texas Pacific-Missouri Pacific of N. O.	Tionesta Valley	Toledo, Peoria & Western	Toledo Terminal	Toronto Hamilton & Buffalo	Tremont & Gulf	Uintah	Union Pacific	Union	Upper Merion & Plymouth	Utah	Virginian	Wabash	Washington Terminal	Western Maryland	Western Pacific	Wheeling & Lake Erie	Wichita Falls & Southern	Winston-Salem South-bound	Wrightsville & Tennille	Roads with less than 10 locomotives	Total defects	
					1		9								1	3					52	660
																					15	127
																					7	87
																					6	6
																					17	289
																					43	407
																					17	372
																					240	2,326
																					180	1,342
																					45	345
																					45	129
																					19	54
																					85	1,100
																					2	77
																					113	1,491
																					42	654
																					63	105
																					72	401
																					85	480
																					85	1,472
																					31	356
																					43	203
																					37	951
																					28	128
																					26	212
																					19	289
																					40	384
																					19	404
																					40	28
																					76	377
																					4	33
																					174	1,909
																					607	8,173
																					30	351
																					7	79
																					26	218
																					7	215
																					18	247
																					72	491
																					109	833
																					25	174
																					11	242
																					18	390
																					11	242

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

Table with columns: Road, Percentage inspected defective (1934-1923), Ordered out of service (1934-1923). Lists various railroad lines and their inspection statistics.

1 Atlanta, Birmingham & Atlantic prior to 1927. 2 Includes Buffalo & Susquehanna and Buffalo, Rochester & Pittsburgh, 1933-34. 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, 1931-34. 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

Table with columns: Road, Percentage inspected defective (1934-1923), Ordered out of service (1934-1923). Continuation of the previous table, listing more railroad lines.

8 Included in Canadian National, 1925-27. 9 Included in Atchison, Topeka & Santa Fe, 1923. 10 Includes Alabama & Vicksburg, Gulf & Ship Island, Vicksburg, Shreveport and Pacific, and Yazoo & Mississippi Valley, 1927-34. 11 Includes Portland Terminal, 1932-34. 12 Includes Ohio Central Lines, 1927-34.

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	Percentage inspected defective							Ordered out of service						
	1934	1933	1931	1929	1927	1925	1923	1934	1933	1931	1929	1927	1925	1923
Oregon Short Line.....	9	22	11	22	27	42	61	2	3	4	0	2	3	13
Oregon-Washington R. R. & Navigation Co.....	14	18	16	12	17	11	35	1	3	2	2	4	6	13
Patapsco & Back Rivers.....	8	10	0	50	47	44	60	0	0	0	1	1	0	1
Pennsylvania.....	13	6	10	33	44	61	76	70	24	33	153	335	573	687
Pennsylvania-Reading Seashore Lines.....	10							0						
Peoria & Eastern <sup>13</sup> .....	35	21	30					1	2	5				
Peoria & Pekin Union.....	0	0	40	14	23	31	54	0	0	0	0	0	1	1
Pere Marquette.....	13	9	12	21	38	57	83	3	0	3	8	14	21	68
Philadelphia, Bethlehem & New England.....	34	40	21	65	74	76	67	6	2	1	16	14	2	2
Pittsburgh & Lake Erie.....	8	3.3	1.9	6	12	10	27	1	0	0	0	0	0	10
Pittsburgh & Shawmut.....	2	0	4	4	0	47	52	0	0	0	0	0	0	2
Pittsburgh & West Virginia.....	10	9	32	57	39	0	33	1	2	4	30	8	0	0
Pittsburgh, Chartiers & Youghiogheny.....	0	6		0	17	0		0			0	0	0	
Pittsburg, Shawmut & Northern.....	2	0	3.6	8	25	53	86	0	0	0	1	2	0	0
Quebec Central.....	100		0	100				1		0	0			
Reading.....	21	9	13	33	42	48	59	23	6	5	31	22	26	12
Richmond, Fredericksburg & Potomac.....	8	6	14	18	30	43	58	0	0	0	1	1	2	3
Rio Grande Southern.....	0	0	0	0	70	62	100	0	0	0	0	8	8	2
River Terminal.....	45	0	0	71	43	70	0	0	0	0	5	1	0	0
Rutland.....	2.5	3.6	6	6	12	44	54	0	0	0	0	1	3	1
St. Johnsbury & Lake Champlain.....	4.5	0	16					0	0	0				
St. Joseph & Grand Island.....	6	9	21	11	36	38	43	0	0	0	0	0	1	1
St. Louis & Hannibal.....	83	80	51	43	57	100	100	4	1	7	1	0	5	2
St. Louis-San Francisco.....	4.1	2.5	3.9	14	22	49	88	2	3	1	7	12	65	346
St. Louis Southwestern.....	11	14	8	4.3	22	47	86	10	10	4	2	22	14	54
San Antonio, Uvalde & Gulf.....	0	2.7	0	0	36	59	72	0	0	0	0	5	5	4
San Diego & Arizona Eastern.....	10	6	13	38	30	55	44	1	0	2	4	3	0	1
Sandy River & Rangeley Lakes.....	0		10	0	62	7		0	0	0	0	1	1	
Savannah & Atlanta.....	7	17	19	80	67	73	68	0	0	0	0	0	2	3
Seaboard Air Line.....	2.3	4.6	9	37	56	51	55	1	3	2	24	43	33	23
Sierra Railway of California.....	0	8	0					0	0	0				
South Buffalo.....	15	8	39	23	29	75	0	2	0	8	0	1	0	0
Southern Pacific, lines east.....	4	4	3.3	5	13	30	47	4	0	1	3	10	37	28
Southern Pacific, lines west.....	12	11	11	24	27	33	38	7	6	13	47	50	51	24
Southern Pacific of Mexico.....	18		0	30	100	100		1		0	2	3	1	
Southern.....	9	4.6	9	12	24	36	59	33	7	15	13	38	56	177
Spokane International.....	9	25	9	13	28	0	37	0	0	0	0	0	0	2
Spokane, Portland & Seattle.....	38	11	22	22	33	32	60	6	0	1	1	2	4	13
Steelton & Highspire.....	24	0	19	24	48			0	0	1	0	2		
Tennessee, Alabama & Georgia.....	11	6	20	18				0	0	1	1			
Tennessee Central.....	38	36	14	47	65	74	89	11	8	0	14	40	23	63
Tennessee Coal, Iron & R. R.....	18	0	7	38	67	40	50	0	0	0	0	0	0	0
Terminal R. R. Association of St. Louis.....	32	37	32	41	44	62	76	11	6	4	0	3	1	6
Texas & Pacific.....	10	2	0	1	12	16	62	8	0	0	1	3	1	91
Texas-Mexican.....	22	17	27	43	50	33	50	0	0	0	0	1	0	1
Texas Pacific-Missouri Pacific of N. O.....	0	0	0	4	10	57	83	0	0	0	0	0	2	0
Tionesta Valley.....	12		100	38	17	80	100	0		2	2	2	7	0
Toledo, Peoria & Western.....	2.2	2.4	25	65	88	87	93	1	0	2	4	7	2	4
Toledo Terminal.....	0	0	5	45	35	3	41	0	0	0	0	0	0	3
Toronto, Hamilton & Buffalo.....	0	0	0	0	0			0	0	0	0	0		
Tremont & Gulf.....	12	0	0	67	20	58	0	0	0	0	0	2	3	0
Uintah.....	0	0	0	0	0	75		0	0	0	0	0		
Union Pacific.....	12	15	9	17	20	30	41	3	7	2	8	17	19	26
Union.....	11	0	11	9	29	80	10	0	0	1	2	0	0	2
Upper Merion & Plymouth.....	55	23	28	60	62			9	2	0	7	8		
Utah.....	0	0	0	11	4	26	19	0	0	0	0	0	0	0
Virginian.....	12	10	17	22	50	58	75	0	0	1	0	2	5	45
Wabash.....	8	1.1	0	1.5	6	47	82	0	1	0	1	2	21	89
Washington Terminal.....	27	9	0	10	43	40	89	0	0	0	0	1	1	2
Western Maryland.....	7	8	13	26	42	54	76	0	0	1	3	13	22	90
Western Pacific.....	5	5	16	25	19	36	37	0	0	5	9	1	13	9
Wheeling & Lake Erie.....	6	9	8	42	55	67	74	0	2	1	7	10	20	31
Wichita Falls & Southern.....	33	64	18	4	0	87	100	1	2	1	1	0	6	1
Winston-Salem Southbound.....	0	0	22	33	50	56	77	0	0	0	0	0	1	1
Wrightsville & Tennille.....	7	0	3.2	12	24	54	29	0	0	0	0	0	3	0
Less than 10, discontinued roads, and industrial locomotives.....	30	28	32	40	51	56	56	150	125	203	326	554	570	373
All roads.....	12	10	10	21	31	46	65	754	544	688	1,490	2,539	3,637	7,075

<sup>13</sup> Included in Cleveland, Cincinnati, Chicago & St. Louis prior to 1931. Fractional percentages not shown unless percent defective is less than 5, otherwise nearest numeral is given.

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.

ILLUSTRATIONS OF LOCOMOTIVE BOILER EXPLOSIONS OR CROWN SHEET FAILURES AND LOCOMOTIVE DEFECTS