

British Locomotive Practice and Performance

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

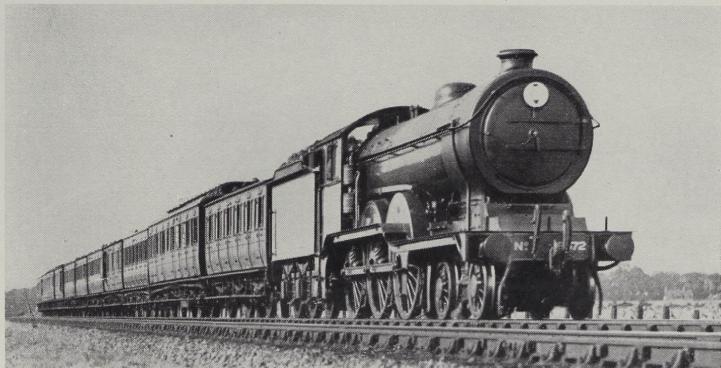


Photo.]

Up stopping train near Trumpington, L.N.E.R.
Rebuilt "B12" class 4-6-0 locomotive No. 8572

[E. R. Wethersell

In order to gather up the threads of various subjects which have been discussed in recent issues, I am devoting the whole of the present article to locomotive performance. And justifiably, because various runs of which I have received details recently from a number of correspondents who are all thoroughly competent recorders together make a batch of such extraordinary merit that it would be a pity to hold them over until the various stretches of line concerned are being more thoroughly dealt with. A point of great interest is that all these runs, with two exceptions, were made by 4-6-0 locomotives, and show that the modern British 4-6-0 is well capable of maintaining average speeds at round about 75 m.p.h. over long distances—speeds, in fact, hitherto associated mainly with Pacific locomotives and streamline trains of limited formations—and, further, they reveal how little up to the present time we have exploited the tractive powers of some of our locomotive designs of ten to twenty years ago, in the youth of which such feats would barely have been dreamed of. In the runs that follow all the four railway groups are represented, and each one has first class performances to set on

record—in several instances, indeed, times and speeds that with little doubt were themselves records.

To begin with, since completing my September article, I have received from correspondents details of three further runs over Southern metals, two of a remarkable description, and the other an effort that earns no epithet short of "phenomenal." The former reintroduces that lively combination, Driver Payne, of Nine Elms, and Lemaître "Lord Nelson" No. 865, *Sir John Hawkins*, with a 12-car Pullman train of 462 tare tons—62 tons over limit—and 495 tons gross, on the up Bournemouth Belle. Good time, $1\frac{1}{2}$ min. inside schedule, was made to Southampton; then, after an easy start out of Southampton, there came a steady acceleration up the $16\frac{1}{2}$ miles averaging 1 in 252, from 49 m.p.h. at Allbrook junction, Eastleigh, to $55\frac{1}{2}$ m.p.h. at Litchfield—a most vigorous piece of work. From Basingstoke, Payne got an absolutely clear road, and made first class use of it; $76\frac{1}{2}$ m.p.h. before Hook and at Fleet was the maximum speed, but with minima as high as $70\frac{1}{2}$ at milepost 31, 68 after Weybridge, and $67\frac{1}{2}$ after Surbiton, coupled with speeds of $75\frac{1}{2}$ m.p.h. from Woking to



Photo.]

Hastings-Tunbridge Wells train near Wadhurst, S.R.

Wainwright Class "D" 4-4-0 No. 1746

[D. H. Clarke



Photo.]

Hastings-Tonbridge train near West St. Leonards, S.R.

Class "N1" 2-6-0 No. 1880

[J. P. Wilson



Photo.]

West of England express passing over the Frome avoiding line, G.W.R.

"Castle" class 4-6-0 No. 4099 *Kilgerran Castle*

[W. Vaughan Jenkins

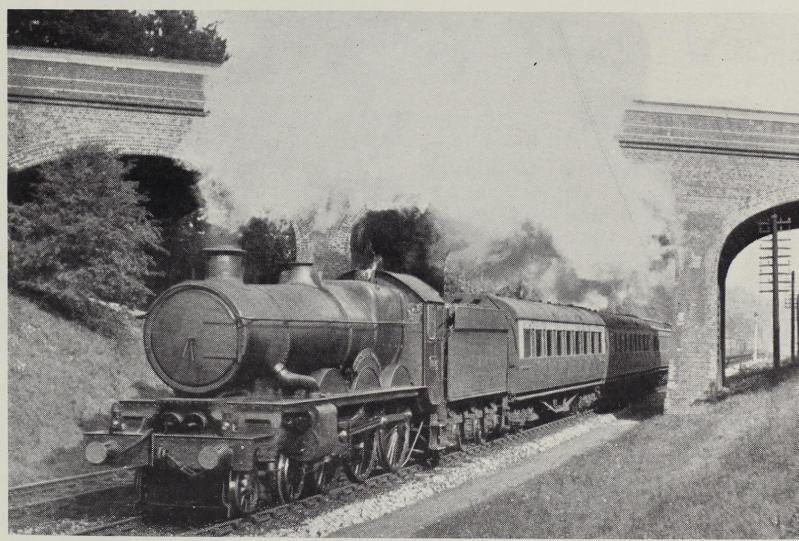


Photo.]

West of England express near Reading, G.W.R.

"Castle" class 4-6-0 No. 4097 *Kenilworth Castle*

[M. W. Earley

S.R. BOURNEMOUTH-WATERLOO
Engine: 4-cyl. 4-6-0, No. 865, *Sir John Hawkins*
(Lematre multiple-jet exhaust).
Load: 12 Pullmans, 462 tons tare, 495 tons gross.

Dist.	Miles	Sched.	Actual	Speeds		
				min.	m.	s.
0.0	BOURNEMOUTH CENTRAL	35	33	30	—	
3.6	Christchurch	—	6	26	65½	*57
6.9	Hinton Admiral	—	10	10	46	
12.4	Sway	—	16	16	62/80	
14.2	Lymington Junction	19	18	03	65	
15.1	BROCKENHURST	—	18	56	*66/60	
19.8	Beaulieu Road	—	23	28	58	
22.5	Lyndhurst Road	—	26	02	70	
26.0	Redbridge	—	29	40	*40	
28.7	SOUTHAMPTON CENTRAL	35	33	30	—	
1.1	Northam Junction	—	3	23	*20	
3.3	Swathling	—	7	20	40½	
5.6	EASTLEIGH	9	10	22	48	
9.5	Shawford	—	14	52	52½	
12.6	WINCHESTER	—	18	24	53	
14.7	Winchester Junction	—	20	48	53½	
17.4	Waller's Ash	—	23	53	54	
21.1	Micheldever	—	27	49	54½	
22.9	Litchfield	—	29	51	55½	
28.9	Worting Junction	37	35	36	67/860	
31.4	BASINGSTOKE	—	37	49	76½	
37.0	Hook	—	42	21	72	
42.7	Fleet	—	46	54	76	
46.0	Farnborough	—	49	35	74	
48.2	Milepost 31	—	51	26	70½	
51.2	Brookwood	—	53	52	75	
54.8	WOKING	60	56	46	75½	
57.5	Byfleet	—	58	54	75½	
60.1	Weybridge	—	60	59	68	
62.1	Walton	—	62	44	73½	
65.9	SURBITON	—	66	56	67½	
71.9	WIMBLEDON	—	71	13	69	
74.2	Milepost 5	—	73	23	60	
75.3	CLAPHAM JUNCTION	79	74	54	*30	
77.9	Vauxhall	—	78	33	—	
79.2	WATERLOO	—	86	81	10	—

*Service slack

Byfleet, 73½ at Walton, and 69 maintained to Wimbledon, the 40.5 miles from Basingstoke to Wimbledon were covered with this 495-ton load at an average of 72.7 m.p.h. The result was not only that "even time" had been beaten by Surbiton, but the Belle was brought into Waterloo in 81 min. 10 sec. from Southampton, gaining all but 5 min. The actual running times from Bournemouth to Waterloo add up to 114½ min., and my correspondent reckons that this would be equivalent to a non-stop run in 113 min.

Second comes another 15-coach run on a down Bournemouth express with a "Schools" class 4-4-0 in which, although the load of 510 tons was 15 tons less than the biggest "Schools" load in the September issue, gave an actual time of 86 min. 32 sec. from Waterloo to Southampton Central. Driver Allen, of Bournemouth shed, was responsible for this first-class performance. A deficiency on schedule of nearly 1½ min. at Woking had been converted to 1½ min. ahead by Eastleigh; and whether it be in covering the 45.3 miles of hard "collar work" from

Wimbledon to Wootton in 46 min. 48 sec. or in maintaining an average of 61.5 m.p.h. over the 70.0 miles from Wimbledon to St. Denys, the 4-4-0 did most exceptional work in view of the load. The latter was carried through to Bournemouth, Christchurch, 25.1 miles, being passed in 30 min. 6 sec., but signals were on at Boscombe, and prevented the completion of the Southampton-Bournemouth run in 35½ min., as would otherwise have been the case. The train was the 6.30 p.m. down, and the correspondent who sends these details adds as a comment "I doubt whether a 'King Arthur' could improve on this 'Schools' performance."

S.R. WATERLOO-SOUTHAMPTON
Engine: 3-cyl. 4-4-0 No. 932, *Blundells*.
Load: 15 coaches, 473 tons tare, 510 tons gross.

Dist.	Miles	Sched.	Actual	Speeds		
				min.	m.	s.
0.0	WATERLOO	0	0	0	0	—
3.9	CLAPHAM JUNCTION	7	8	13	—	
7.3	Wimbledon	—	13	07	47	
12.0	SURBITON	—	18	40	58/65½	
19.1	Weybridge	—	25	24	60/67	
24.4	WOKING	—	29	30	59	
28.0	Brookwood	—	34	18	53	
31.0	Milepost 31	—	37	52	48½	
36.5	Fleet	—	43	34	65½	
42.2	Hook	—	49	03	59/65½	
47.8	BASINGSTOKE	—	54	20	59	
50.3	Worting Junction	—	57	58	50½	
52.6	Wootton	—	59	55	47½	
58.1	Micheldever	—	65	52	64	
66.5	WINCHESTER	—	72	34	82	
73.6	EASTLEIGH	79½	77	52	*60	
77.3	St. Denys	—	81	26	62	
78.1	Northam Junction	—	84½	83	20	*15
79.2	SOUTHAMPTON	—	87½	86	32	—



[J. P. Wilson]
3.20 p.m. Marylebone-Manchester express leaving Nottingham, L.N.E.R.
Class "A1" Pacific No. 4478 *Hermit*



[J. P. Wilson]
Marylebone-Huddersfield-Bradford express near New Basford, L.N.E.R.
Class "A1" Pacific No. 4473 *Solaris*

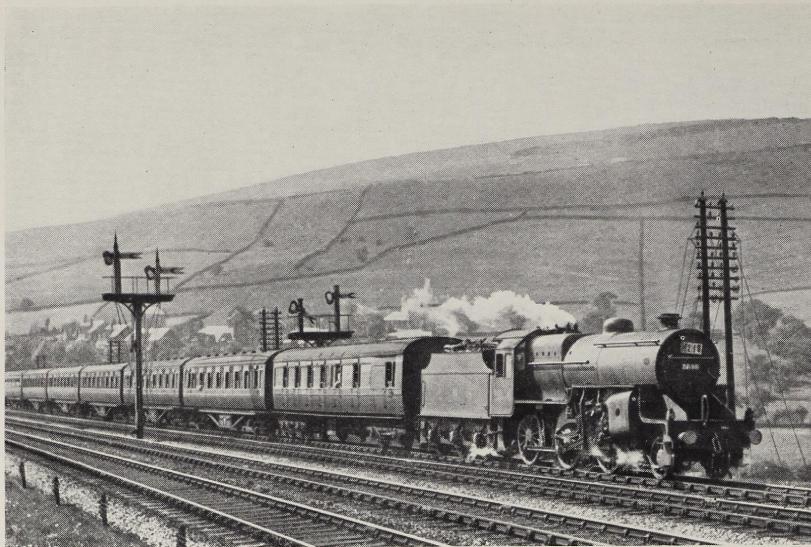


Photo.]

Blackpool-Leicester excursion near Chinley, L.M.S.R.

Standard 2-6-0 No. 2846

[R. D. Pollard]



Photo.]

Down goods train approaching Gowhole sidings, L.M.S.R.

Standard class "4" 0-6-0 No. 3959

[R. D. Pollard]

S.R. WATERLOO-SALISBURY
Engine : 3-cyl. 4-4-0 No. 931, King's Wimbleton.
(Lemaître multiple-jet exhaust)
Load : 9 bogies, 288 tons tare, 305 tons gross.

Dist.		Sched.	Actual	Speeds	
				min.	m. s.
Miles					m.p.h.
0.0	WATERLOO	0	0 00
0.3	Vauxhall	3	40
3.9	CLAPHAM JUNCTION*	7	10
5.5	Earlsfield	9	05
7.3	WIMBLETON	10	55
9.8	Malden	13	25
12.0	SURBITON	15	20
14.4	Esher	17	15
17.1	Walton	19	30
19.1	Weybridge	21	15
21.7	Byfleet	23	20
24.4	WOKING	30	25 30
28.0	Brookwood	28	30
33.2	Farnborough	32	45
36.5	Fleet	35	15
39.8	Winchfield	37	45
42.2	Hook	39	35
47.8	BASINGSTOKE	53	43 50
52.4	Oakley	48	00
55.6	Overton	50	45
59.2	Whitchurch	53	40
61.1	Hurstbourne	55	00
66.4	ANDOVER	58	45
72.8	Grateley	64	00
				sigs.	
78.3	Porton	71	20
				74	30
				sigs.	
83.8	SALISBURY	88	81 50

*Service slack. Average station-to-station speeds

From the passing times it may reasonably be assumed that the speed rose to 77 or 78 m.p.h. before Byfleet, that milepost 31 summit was surmounted at fully 70 m.p.h.—which would be nothing unusual for a streamliner of the L.N.E.R., but this was a 67-ton 4-4-0 and not a 103-ton 4-6-2—that 81 to 82 m.p.h. was reached on the level past Fleet and again beyond Hook, that the minimum at Worting summit was 62 or 63 m.p.h., that 90 was attained in Hurstbourne dip, and 87 or 88 before Andover, where the brakes were just touched; finally came a minimum of about 57 or 58 m.p.h. at Grateley. Nemesis now came in the form of signals before Porton and a dead stand there for 3 min. 10 sec., notwithstanding which Silk and his train rolled into Salisbury in 81 min. 50 sec. from Waterloo, nearly six minutes early! For this was the 10.24 a.m. on a July Saturday, allowed 88 min. for the run, whereas from Waterloo to Salisbury, 83.8 miles, the net time was 74 $\frac{1}{4}$ or 74 $\frac{1}{2}$ min. Be it noted that the 60.8 miles from Surbiton to Grateley were run in 48 min. 40 sec., at an average of almost precisely 75 m.p.h., for a measure of this very exceptional achievement.

And now, reverting for a moment to the L.N.E.R. Silver Jubilee, while writing this article, I have had another run on the down train with some unusual features.

Silver Link, No. 2509, was the engine, apparently just as fresh as on that afternoon, four years ago, when the inaugural run of ineffaceable memory was made. On this recent trip, after a relatively gentle start to Finsbury Park, we accelerated with such terrific rapidity as to attain 72 $\frac{1}{2}$ m.p.h. by the 4 $\frac{1}{2}$ milepost, before passing Wood Green. I never previously remember reaching so high a speed as this in the down direction within 4 $\frac{1}{2}$ miles of a London terminus; the nearest approach was on the record 60-min. run to Swindon of the 5 p.m. from Paddington on June 6, 1932, when we were doing 71.7 m.p.h. by milepost 5, but that was with a dead level start, as compared with the L.N.E.R. 1 in 105-110 up to Holloway. All the way up to Potter's Bar we maintained a steady 69-71 $\frac{1}{2}$ m.p.h., topping the summit at 70 m.p.h. exactly; having passed Finsbury Park in 5 min. 33 sec., our times were 7 min. 54 sec. to Wood Green, 11 min. 28 sec. to New Barnet, and 14 min. 28 sec. to Potter's Bar, so that the average speed from Wood Green up to Potter's Bar was 70.1 m.p.h. After that matters proceeded normally until beyond Peterborough (times were 18 min. 29 sec. to Hatfield, 17.7 miles; 23 min. 56 sec. to Knebworth, 25.0 miles; 29 min. 20 sec. to Hitchin, 31.9 miles; 48 min. 39 sec. to Huntingdon, 58.9 miles; and 63 min. 14 sec. to Peterborough, 76.4 miles); most slacks were over-emphasised, as witness 70 m.p.h. at Marsh Moor, 66 at Langley troughs, 77 through Hitchin, 72 at Offord, 58 at Fletton junction, and 20 through Peterborough; there was a minimum of 77 $\frac{1}{2}$ m.p.h. at Woolmer Green, and the maxima were 93 $\frac{1}{2}$ m.p.h. at Tempsford and 92 at Holme.

The second exceptional effort was from Helpston onwards. We had recovered easily from Peterborough and passed Werrington at 69 when the engine was opened out. By the time we passed Tallington speed had reached 85 m.p.h.; up the 1 in 440-264 to Essendine we accelerated to no less than 90 m.p.h., and on the 2 undulating miles that follow there was a further rise to 92 before we struck the beginning of the 1 in 200 at milepost 91. Little Bytham was passed at 86 $\frac{1}{2}$ m.p.h., the 4 $\frac{1}{2}$ miles at 1 in 200 brought speed down to 77 $\frac{1}{2}$ m.p.h. before Corby, the short level through the station lifting

us again to 80½, while Stoke summit was breasted at 74 m.p.h. The average speeds were 87.8 m.p.h. from Tallington to Essendine, 90.6 from Essendine to Little Bytham, 81.7 from Bytham to Corby, and 75.5 from Corby to Stoke—total 15.3 miles to the summit in 10 min. 58 sec., at a mean rate of 83.7 m.p.h. with a 265-ton train—surely a further confirmation of my recent claim that these L.N.E.R. streamliners are still, from the performance point of view, in a class apart. Stoke, 100.1 miles, was passed in 82 min. 16 sec., Grantham 105.5 miles, in 86 min. 28 sec., Newark, 120.1 miles in 94 min. 47 secs.; we were all but stopped by signal approaching Retford (138.6 miles, 113 min. 57 sec.), and then took things fairly easily, with vigorous attention to service slacks, through Doncaster, Selby, and York, passing Doncaster, 156.0 miles, in 129 min. 30 sec., Selby, 174.4 miles, in 144 min. 36 sec., and York, 188.2 miles in 158 min. 58 sec., on time. A third feature of note was again very high sustained speed on the level north of York—88 m.p.h. sustained from Alne to Raskelf, 85 at Sessay, 92 at Thirsk, and 85 kept up until we slowed for Wiske Moor troughs, north of Northallerton; our average speed over the 18.8 miles from Alne to Northallerton was 87.3 m.p.h. So Northallerton, 218.2 miles, was passed in 182 min. 54 sec., and with a very easy finish we were into Darlington, 232.3 miles, in 196 min. 12 sec., or about 194 min. net.

Mention in the last two paragraphs of the G.W.R. 60 min. run to Swindon in 1932 reminds me of a run on the down Bristolian, of which I received details recently from a correspondent, and on which the time to passing Swindon, with 35 tons more trainload, was only 1½ min. longer. Had the Bristolian not started 1½ min. late, it is doubtful whether she could have kept clear of the 9.15 a.m. down ahead; as it was, passing Swindon some 4¾ min. early, there was a bad check between Swindon and Wootton Bassett. Up to that point speed had never fallen below the 80 m.p.h. mark throughout from Reading to milepost 80½, not even up the 1 in 75 which extends most of the way from Didcot to Shrivenham; indeed, an average of 80.2 m.p.h. was sustained for 71.7 miles from Southall to milepost 80½—a magnificent feat for an 80-ton

G.W.R. PADDINGTON-BRISTOL						
Engine: 4-cyl. 4-6-0 No. 5055 <i>Lydford Castle</i>						
Load, 7 coaches, 231 tons tare, 245 tons gross.						
Dist.		Sched.	Actual	Speeds		
Miles		min.	m. s.	m.p.h.		
0.0	PADDINGTON	..	0	0	35	—
1.3	Westbourne Park	..	—	2	35	—
5.7	Ealing Broadway	..	—	7	30	61
9.1	SOUTHALL	..	11	10	37	68
13.2	West Drayton	..	—	14	05	75
18.5	SLOUGH	..	19	18	08	80
24.2	Maidenhead	..	—	22	31	79
31.0	Twyford	..	—	27	40	79
36.0	READING	..	33	31	22	82
41.5	Pangbourne	..	—	35	26	82
44.7	Goring	..	—	37	47	81½
48.5	Cholsey	..	—	40	26	84
53.1	DIDCOT	..	46½	43	46	84
56.5	Steventon	..	49½	46	14	81
60.4	Wantage Road	..	—	49	07	81
63.9	Challow	..	—	51	42	80½
66.5	Uffington	..	—	53	42	80½
71.6	Shrivenham	..	—	57	27	80
77.3	SWINDON	..	66½	61	45	80½
80.8	Milepost 80½	..	—	64	17	82
				sigs.	12	
87.7	Dauntsey	..	—	73	44	78
94.0	CHIPENHAM	..	80	78	38	75
98.3	Corsham	..	—	82	07	72½
101.9	Box	..	—	84	49	85½/70
104.6	Bathampton	..	—	87	07	72
106.9	BATH	..	—	91½	89	28 *33
111.3	Salford	..	—	94	30	65
116.7	St. Anne's Park	..	—	99	07	72
118.3	BRISTOL	..	105	102	15	—

*Service slack

"Castle." Despite the signal check, which cost about 4½ min., the Bristolian was through Chippenham nearly 1½ min. early, and with a very slow entry from St. Anne's Park into Temple Meads arrived 2½ min. early. The net time I should put at 97½ min. for the 118.3 miles, or possibly 97½ min. with a very fast descent of Dauntsey bank; 97½ min. represents a start-to-stop average of 72.8 m.p.h. The driver was Hardy, of Old Oak Common shed; and it is pleasant thus to record that new engine-crews are thus arising to carry on the tradition of the Great Western high speed trains so firmly established by Street, Lewis, and other past drivers of high repute.

Besides this run I have tabulated an equally fine effort on the Bristolian, timed by the same correspondent as the run just quoted, but in a log which lacks the driver's name. The 2½ miles at 1 in 75 from Stapleton Road up to Horfield reduced the speed from 44½ to 32 m.p.h., and in addition to a slack at Filton Junction, another was made at Stoke Gifford East. From here the engine accelerated steadily up 1 in 300 to 65½ m.p.h. on entering Sodbury tunnel, and even slightly accelerated on the 1 in 300 through the tunnel to 66 before passing Badminton. After this a fine burst of speed down to Little Somerford, with a maximum of 92 m.p.h.,

BRITISH LOCOMOTIVE PRACTICE AND PERFORMANCE 253

G.W.R. BRISTOL-PADDINGTON
Engine: 4-cyl. 4-6-0 No. 5019, *Treago Castle*.
Load, 7 coaches, 231 tons tare, 245 tons gross.

Dist.		Sched.	Actual	Speeds
Miles		min.	m. s.	m.p.h.
0.0	BRISTOL	..	0	0 00
1.6	Stapleton Road	..	—	3 53 44½
2.5	Ashley Hill	..	—	5 13 32
4.8	Filton Junction	..	—	9½ 10 *37
6.1	<i>Stoke Gifford East</i>	..	11½	11 12 *40
9.3	Coaley Heath	..	—	14 39 60
13.0	Chippenham Sodbury	..	—	18 21 65½
17.6	Badminton	..	23½	22 32 66
23.4	Hullavington	..	—	27 03 86
27.9	Little Somerford	..	—	30 03 92
30.6	Brinkworth	..	—	31 51 87½
34.7	Wootton Bassett	..	37½	35 04 *59
40.3	SWINDON	..	42½	40 11 71
46.0	Shrivenham	..	—	44 41 81½
51.1	Uffington	..	—	48 18 85
53.7	Challow	..	—	50 11 85
57.2	Wantage Road	..	—	52 37 87½
61.1	Steventon	..	58½	55 16 87½
64.5	DIDCOT	..	61	57 34 89
69.1	Cholsey	..	—	60 48 85
72.9	Goring	..	—	63 26 84½/80
76.1	Pangbourne	..	—	65 46 81½
81.6	READING	..	74	69 51 81
86.6	Twyford	..	78	73 31 82
93.4	Maidenhead	..	83	78 23 84
97.6	Milepost 20	..	—	81 25 84
				sigs. 5
99.1	SLOUGH	..	87½	84 49 27
104.4	West Drayton	..	—	90 05 71
108.5	SOUTHALL	..	94½	93 26 76
111.9	Ealing	..	—	96 01 79
113.3	Acton	..	—	97 06 80½
116.3	Westbourne Park	..	101	99 36 —
117.6	PADDINGTON	..	105	102 10 —

*Service slack

took the train through Wootton Bassett 2½ min. early. Once again there was some notable sustained speed from Swindon onward; from Shrivenham to mile post 20, this time with the tendency of the road favouring the engine, speed never fell below 80 m.p.h., and all but touched 90 at Steventon, the average over the 51.6 miles from Shrivenham to milepost 20 being 84.3 m.p.h., and over the 80 miles from Badminton to the same point, Wootton Bassett slack included, 81.5 m.p.h., as this 80-mile stretch was reeled off in 58 min. 53 sec. But the Bristolian was 4½ min. early through Maidenhead, and as on the down journey paid the penalty of adverse signals, this time being all but stopped between Burnham Beeches and Slough. Accelerating rapidly from the slack, the driver passed West Drayton still a minute in hand, and just got up to 80 m.p.h. again at Acton, before shutting off steam for the terminus. Assuming the continuance of speed at or slightly over 80 m.p.h. from Slough to Acton, the run of 117.6 miles, actually completed in 102 min. 10 sec.—2½ min. inside schedule—would have taken 98 min., instead of the 105 min. allowed, which works out at 72.0 m.p.h. from start to stop.

We come next to the Midland Division of the L.M.S.R., on which a run with one of the "5X" 4-6-0s of the "Jubilee" type, most ably handled by Driver Howard of Kentish Town shed, offers a magnificent example of determined recovery of lost time in face of two very bad checks intermediately, despite which the arrival at St. Pancras, after a late start of 6 min., was only 1¼ min. behind time. The load was a moderate one of eight bogies, weighing full 275 tons. Uphill the speeds were not perhaps exceptional, as measured by the standards which have been set up by these capable engines; although a time of 16 min. 52 sec. for the 19.6 miles from Bedford up to Luton, aided by an initial speed of 85 m.p.h., was certainly very fine, and the minimum of 76 at Elstree, "rushed" up the 2½ miles at 1 in 200 from 91 before Radlett, was the highest figure I recollect having seen at this point. But the sustained high speed over all the easier stretches was very noteworthy, and gave the exceptionally high average—relatively to the steep gradients of this route—of 76.8 m.p.h. over the 51½ miles from Sharnbrook to Cricklewood. Some of the times from intermediate stations into St. Pancras must, I fancy, have been records or very near it, as, for example, 53 min. 58 sec. from Wellingborough, 40 min. 57 sec. from Bedford, 24 min. 5 sec. from Luton, 10 min. 1 sec. from Radlett, and 1 min. 5 sec. from Elstree.

L.M.S.R. LEICESTER-ST. PANCRAS
Engine: "5X" 3-cyl. 4-6-0 No. 5598, *Basutoland*.
Load, 8 coaches, 261 tons, tare, 275 tons gross.

Dist.		Sched.	Actual	Speeds
Miles		min.	m. s.	m.p.h.
0	LEICESTER	..	0	0 00
3½	Wigston	..	—	5 51 53
7½	Great Glen	..	—	10 02 60½
10	Kibworth	..	—	12 29 59½
12½	East Langton	..	—	14 28 83½
				sigs. 5
16	MKT. HARBOROUGH	19	21 01	35
21	Desborough	—	28 09	42½
24½	Glendon South Junction	—	31 12	78½
27	KETTERING	..	31	32 58 86½
30½	Finedon	..	—	35 31 90
				p.w.s. 12
34	WELLINGBOROUGH	37	40 18	50
36½	Irchester	..	42 33	61½/59½
39½	Sharnbrook Summit	43	45 47	51½
46	Oakley	..	—	51 00 88½/82
49½	BEDFORD	..	51	53 19 85
57½	Amphill	..	—	59 49 64½/70
61½	Harlington	..	—	63 50 64½
66½	Leagrave	..	—	68 06 61½
68½	LUTON	..	70	70 11 79
74½	Harpden	..	—	74 24 82/76
79	ST. ALBANS	79	78 02	83½
83½	Radlett	..	—	81 16 91
86½	Elstree	..	—	83 19 76
92	HENDON	..	90	87 19 87
95	West Hampstead	..	—	88 36 71
97½	Kentish Town	..	96	91 50 —
99	ST. PANCRAS	..	99	94 16 —

and 16 min. 14 sec. (*sic*) from St. Albans, the finish of the run being extremely fast. The net time may be taken as not more than 88 min. for the 99.1 miles—11 min. less than schedule, and 17 min. less than the 105 min. which was the standard booking until the relatively recent cut to 99 min. It is a pity that the correspondent who furnishes this run insists on timing to mileposts only, as it makes his figures impossible of exact comparison with those taken by the great majority of recorders to the centre of stations.

Another brilliant time-recovery feat is that next tabulated, by a driver who is a master of this particular craft—Earl, of Camden—on the 5.3 p.m. express from Crewe (4.10 p.m. from Manchester); there is a particular purpose in regaining lost time on this express, as it is due in Euston only 13 min. ahead of the Coronation Scot, and in event of late running may be quietly parked on the slow road to let the streamliner pass. But as Earl's times on this run were equivalent to a non-stop journey from Crewe to Euston in 141 $\frac{1}{2}$ min.—2 $\frac{1}{2}$ min. less than the Coronation

L.M.S.R., CREWE-EUSTON.
Engine : "Royal Scot" 3-cyl. 4-6-0 No. 6125.
Load, 11 coaches, 356 tons tare, 375 tons gross.

Dist.		Sched.	Actual	Speeds
Miles		min.	m.	s.
0.0	CREWE	0	0	00
1.1	Milepost 157	—	3	21
4.8	Wreay	—	8	17
10.5	Southwaite	—	12	34
10.8	Calthwaite	—	16	23
13.1	Plumpton	19	19	01
17.9	PENRITH	24	23	45
21.1	Clifton Junction	—	26	42
22.1	Clifton	—	27	43
26.2	Thrimby Grange	—	32	37
29.4	Shap	—	36	45
31.4	Shap Summit	41	38	48
36.9	TEBAY	46	43	59
41.2	Low Gill	—	47	38
42.9	Gravrigg	—	49	13
50.0	OXENHOLME	58	55	12
53.4	Hincaster Junction	—	57	58
55.5	Milnthorpe	—	59	23
58.3	Burton	—	61	23
62.8	CARNFORTH	69	64	48
66.0	Hest Bank	—	67	18
69.1	LANCASTER	74	69	58
70.2	Lancaster Junction	—	71	01
73.4	Galgate	—	74	18
77.4	Scorton	—	77	56
80.6	Garstang	—	80	45
82.6	Brock	—	82	32
85.3	Barton	—	84	57
88.8	Oxhey	—	88	08
90.1	PRESTON	—	90	21

*Service Slack. [†]On entering Kilbys tunnel.
[‡]At milepost 118. [§]At Hadmore. [¶]On entering Watford tunnel.

Scot's allowance, with a tare load heavier by two coaches of 59 tons' weight and a "Royal Scot"—the Coronation Scot never even had the chance of seeing the signals of the Manchester train in front! All service slacks on this trip were observed with the utmost rigour, and the approaches to the various stops were very cautious, but there was some glorious running on the open stretches, especially the 12 min. 4 sec. from Bletchley up to Tring, and the average of no less than 76.6 m.p.h. over the 72.3 miles from Welton to Kilburn. The time of 70 min. 11 sec. from passing Rugby into Euston alone cuts the schedule by nearly 6 min., and the total recovery of time from Crewe to Euston, allowing a bare $\frac{1}{2}$ -min. for the slight signal check at Ashby junction (approaching Nuneaton), was 2 $\frac{1}{2}$ min. to Stafford, 3 $\frac{1}{4}$ min. thence to Nuneaton, and 5 $\frac{1}{4}$ min. on to Euston, or 11 min. in all. Other notable features of the run were 52 $\frac{1}{2}$ m.p.h. steadily maintained up the 1 in 177 from Betley Road; the minimum of 64 m.p.h. at Athertonstone and 68 at Roade cutting; and 60 m.p.h. attained both up the rise past Bulkington and the ascent from Rugby to Kilsby tunnel. To run the 36.5 miles from Stafford to Nuneaton in 35 min. 10 sec., or 34 $\frac{3}{4}$ min. net, was a brilliant effort, as also, of course, the 86 min. 42 sec. from Nuneaton to Euston, both start to stop.

Now I want to describe another south-bound run with the Edinburgh and Aberdeen portions of the Royal Scot, which I made immediately after the publication of my July article, containing the record of a notable exploit on this train with a 4-6-0 "Royal Scot" locomotive. The engine was a No. 6138, *London Irish Rifleman*, and the load was one coach less, being ten bogies, 302 tons tare and 315 tons gross; I should suspect, though I did not verify the fact, that the driver was the same, as the two performances had some very similar features. But the *chef d'œuvre* of my run was the brilliant start to Preston, whereby, for the first time in my experience, we bettered "even time" with a "Royal Scot" on this stage alone, passing Brock, 82.7 miles, in 82 min. 32 sec. from Carlisle, and Oxheys box, 88.8 miles, in 88 min. 8 sec.; to Preston, 90.1 miles, the time was 90 min. 21 sec., or 4 $\frac{3}{4}$ min. less than schedule. The ascent of Shap was a most inspiring

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L.M.S.R., CARLISLE-PRESTON
Engine : 3-cyl. 4-6-0 No. 6138, *London Irish Rifleman*.
Load, 10 coaches, 302 tons tare, 315 tons gross.

Dist.		Sched.	Actual	Speeds
Miles		min.	m.	s.
0.0	CARLISLE	0	0	00
4.9	Wreay	—	9	29
7.4	Southwaite	—	12	34
10.8	Calthwaite	—	16	23
13.1	Plumpton	19	19	01
17.9	PENRITH	24	23	45
21.1	Clifton Junction	—	26	42
22.1	Clifton	—	27	43
26.2	Thrimby Grange	—	32	37
29.4	Shap	—	36	45
31.4	Shap Summit	41	38	48
36.9	TEBAY	46	43	59
41.2	Low Gill	—	47	38
42.9	Gravrigg	—	49	13
50.0	OXENHOLME	58	55	12
53.4	Hincaster Junction	—	57	58
55.5	Milnthorpe	—	59	23
58.3	Burton	—	61	23
62.8	CARNFORTH	69	64	48
66.0	Hest Bank	—	67	18
69.1	LANCASTER	74	69	58
70.2	Lancaster Junction	—	71	01
73.4	Galgate	—	74	18
77.4	Scorton	—	77	56
80.6	Garstang	—	80	45
82.6	Brock	—	82	32
85.3	Barton	—	84	57
88.8	Oxheys	—	88	08
90.1	PRESTON	—	90	21

*Service slack. [†]Passing time

affair, with its attained speed of 43 $\frac{1}{2}$ m.p.h. up the 1 in 131 to Wreay; 51 m.p.h. attained up the subsequent 1 in 184 and 55 up the 1 in 228 past Southwaite and a minimum of 51 on the 1 in 172-141 before Plumpton; 66 m.p.h. through Penrith; 60 at the beginning of the 7 miles at 1 in 125, on which we fell to 46 m.p.h. but then recovered to 47 $\frac{1}{2}$; and, finally, 51 through Shap and 48 over the summit, passed nearly 2 min. early. On the descent matters went normally though briskly to Oxenholme, after which, as on the previous run, there was some very lively travelling, with 85 m.p.h. at Hincaster junction, a sustained 88 at Milnthorpe, 75 over Burton "hump," and 85 at Carnforth, the Oxenholme-Carnforth time (12.8 miles) being only 9 min. 36 sec. Again, the running was brisk but not abnormal from Lancaster onwards, speed rising to a maximum of 71 $\frac{1}{2}$ m.p.h. at Brock. The 57.4 miles from Shap summit to Oxheys were run in 48 min. 57 sec., at an average of 70.4 m.p.h. The remainder of the run I have not tabulated; it was of excellent quality throughout, but had no exceptional features. After severe pitfall slowings at Boar's Head and Bamfurlong, we were only 1 $\frac{1}{2}$ min. ahead of schedule at Winwick junction, and kept from $\frac{3}{4}$ min. to 2 $\frac{1}{2}$ min. ahead as far as Nuneaton, when a further vigorous effort was made, putting us 6

min. ahead of schedule at Watford (281.7 miles in 274 min.). From there we ran gently in, and despite a signal stop on Camden bank, were into Euston, 299.1 miles, in 296 min. 55 sec., 2 min. early, or about 290 min. net, if allowance be made for both of the pitfall slowings.

The next two runs are supplementary to the series recently described with engines of mixed traffic varieties, having driving wheels of 6 ft. or less in diameter. Recently I was considerably impressed with a run by one of the ubiquitous class "5" 6 ft. 4-6-0s of the L.M.S.R., over that extremely difficult course between Manchester, Huddersfield, and Leeds. The train concerned was the 9 a.m. express from Liverpool to Newcastle, which combines the fastest eastbound timing with one of the heaviest loads of the day; on this occasion it was nine coaches, including 12-wheel diner, 293 tons tare and 310 tons gross. The journey starts pleasantly out of Manchester with a rise at 1 in 59 and then 1 in 47, beginning directly the train is through the platforms of Victoria station, and 1 $\frac{1}{4}$ miles long; this earned us the services of a banker as far as Miles Platting, and with the two engines speed fell from 29 to 21 $\frac{1}{2}$ m.p.h. From Miles Platting there is a slight rise to Clayton Bridge, on which we reached 50 m.p.h., and then 1 in 135 and 1 in 100 each for 1 $\frac{1}{4}$ miles, 2 $\frac{1}{2}$ miles in all, on which

L.M.S.R., MANCHESTER-LEEDS.
Engine : 2-cyl. 6 ft. 4-6-0 No. 5363.
Load, 9 coaches, 293 tons tare, 310 tons gross.

Dist.		Sched.	Actual	Speeds
Miles		min.	m.	s.
0.0	MANCHESTER EXCHANGE	0	0	00
1.7	Miles Platting	4	4	36
3.5	Clayton Bridge	—	7	13
4.9	Droylesden	—	8	57
6.6	Ashton-under-Lyne	—	11	20
8.1	STALYBRIDGE	14	13	23*
10.7	Mossley	—	18	05
12.8	Greenfield	—	21	20
14.0	Saddleworth	—	22	18
15.3	Diggle	—	24	23
18.9	Marsden	—	29	27
21.5	Slaithwaite	—	30	25
24.2	Longwood	—	33	02
26.0	HUDDRSFIELD	38	36	32
2.7	Bradley	0	4	48
4.4	Batleyford	—	7	25
5.8	Northorpe	—	9	07
7.5	HECKMONDWIKE	—	11	08
9.3	CLECKHEATON	—	13	17
10.8	Gomersal	—	15	22
12.1	Birstall Town	18	17	11
16.8	Farnley Junction	—	22	52
18.6	LEEDS CITY	30	29	16

*Service slack

we fell to 41 m.p.h. There is no chance of taking a "run" at the bank beyond Stalybridge, owing to the severe slack over the crossover west of the station—surely a place where some realignment, to improve the hard lot of these Yorkshire trains, should not be very difficult or costly—so that in taking the north line from Stalybridge we began the 1 in 125 to Mossley at 30 m.p.h. This 1 in 125 is $2\frac{1}{4}$ miles long, and on it we accelerated to 44 m.p.h.; a mile at 1 in 150 brought us up to 47 m.p.h., which we held on a subsequent mile at 1 in 125, to Greenfield; on $1\frac{1}{4}$ miles at 1 in 175 from Greenfield to Saddleworth we accelerated further to 52 m.p.h., and the final $1\frac{1}{4}$ miles at 1 in 125 to Diggle were surmounted at a minimum of 51 m.p.h. This was an extremely fine climb with a 305-ton train; from Victoria to Diggle is 15 miles of hard work without respite, and the time of 10 min. 24 sec. for the 7.2 miles from Stalybridge up to Diggle was particularly good, though even then barely as good as the schedule requires. There was the usual crawl into Huddersfield, which we reached in 36 min. 32 sec., $1\frac{1}{2}$ min. less than schedule; net time was about $35\frac{1}{2}$ min.

From Huddersfield we took the Heckmondwike line, which is much harder than *via* Dewsbury, as well as being $1\frac{1}{2}$ miles longer; but despite signal checks and a dead stand for signals before and after Farnley, we gained another $\frac{3}{4}$ -min. We had to cross over before Bradley, and this and the slack for the curve under the Central Division Manchester-Wakefield main line gave us a bad start up the short 1 in 85-90 past Batteyford; then, touching $56\frac{1}{2}$ m.p.h. on the slight dip beyond Northorpe, we ran the 4.6 miles up from Heckmondwike to Upper Birstall, which includes $3\frac{3}{4}$ miles at grades steepening from 1 in 100 to 1 in 77, and mostly round about 1 in 80, in 6 min. 3 sec. On the longer stretches at 1 in 77 and 80 up we did not fall below 41 m.p.h.—first class work with this load—and the easier quarter-miles through Cleckheaton and Gomersal each yielded recoveries of 3 or 4 m.p.h. in speed. Without the signal checks we should have been into Leeds in 26 or 27 min., instead of the 30 min. allowed. The impressive feature of this run was the effortless competence with which the engine attacked these banks.

S.R. WATERLOO-ANDOVER
Engine, 6 ft. 4-6-0 No. 475, Class "H15"
Load, 8 coaches, 253 tons tare, 270 tons gross.

Dist.		Sched.	Actual	Speeds	
				Miles	min.
0.0	WATERLOO	0	0 00
3.9	CLAPHAM JUNCTION	7	6 52 *45
7.3	Wimbledon	—	11 00 52
12.0	SURBITON	15	58 62½/67
19.1	Weybridge	22	35 61½
21.7	Byfleet	24	55 68
24.4	WOKING	29	27 50 —
3.6	Brookwood	—	6 54 †47
					p.w.s.
6.6	Milepost 31	—	11 47 25
8.8	Farnborough	—	15 00 52½
12.1	Fleet	—	18 20 64½
17.8	Hook	23	50 60/67½
23.4	BASINGSTOKE	—	28 00 62
25.9	Worting Junction	29	31 35 55
31.2	Overton	—	36 52 66½
34.8	Whitchurch	—	39 55 73½
36.7	Hurstbourne	—	41 26 77½/72½
40.9	Milepost 65½	—	44 35 81½
42.0	ANDOVER	45	45 58 —

*Service slack. †At milepost 30

Another mixed traffic type which has never previously figured in these articles is the "H15" class of the Southern Railway, Mr. Urie's last design, and having 6 ft. driving wheels. The train was the tightly timed 1 p.m. from Waterloo, limited to 325 tare tons, but on this occasion lightly loaded to eight vehicles of 270 gross tons; the engine was No. 475. The best running was seen in recovery from a bad permanent way check at milepost 31, after which the engine developed $67\frac{1}{2}$ m.p.h. on little easier than level track beyond Hook, mounted to Worting at a minimum of 55, and reached $81\frac{1}{2}$ m.p.h. before Andover; the 32.2 miles from Farnborough to milepost 65½ were covered in 29 min. 35 sec., and the 9.7 miles from Overton to the same point in 7 min. 43 sec. The net time for the 42.0 miles from Woking to Andover, for which the allowance is only 45 min., was $43\frac{3}{4}$ min. The matter for comment about this run is that hitherto this class of engine has been particularly sluggish—especially by comparison with the "S15" 5 ft. 7 in. 4-6-0s.

One or two slight misprints crept into my last article. Of these the most obvious concerned the Dorchester-Wareham runs described behind "Schools" class 4-4-0s of the S.R.; these were claimed as having been made with loads of 735 tons, which it may be agreed would be abnormally heavy for this stretch of line. The actual figure should have been 135 tons, in four-coach formations.

