British Locomotive Practice and Performance

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

AFTER the locomotive exchange trials of 1948, while the "Duchesses" and the "Kings" depart, it may well be that "the tumult and the shouting" will not die for some considerable time, any more than it did in 1925. In a letter to the Editor, Mr. R. A. Savill tilts at me for "bewailing the omission of the L.N.E.R. 'V2' 2-6-2s" from the recent locomotive trials. "I feel that in reviewing these trials in the railway Press," he writes, "the real object of the trials is being overlooked; we are out to find the best and most economical types for future standard construction, and types that have as high a route availability as possible. The L.N.E.R. 'V2s'," Mr. Savill continues, "are not a modern type; they have a very limited availability, especially in comparison with other types on trial, such as the *ex*-L.M.S.R. Class '5' 4-6-0s, and in recent derailments, while not actually proven guilty, they have at least been under suspicion.

"And, speaking now as an operating railwayman, and not in the role of the enthusiast or historian, I consider that the railway Press and Mr. Allen overlook the paramount factors of coal and oil and water consumption. I must not be so indiscreet as to disclose such information as I have on the coal consumption of the contestant types during the trials, but this economic factor must not be overlooked, especially as the British Transport Commission is so anxious that the railways should be a paying economic proposition. Punctual and early arrivals at the London termini are obviously both desirable and praiseworthy, but a locomotive that consumes 40 lb. per mile is going to have a better chance of survival under British Railways than one consuming some 70 lb. odd."

Let us examine this statement. In the first place "*bewailing* the omission" is a slightly exaggerated comment on my reference, in the July-August issue, to the "curious omission of the Great Western 'Castle' 4-6-0s and the London & North Eastern 'Green Arrow' 2-6-2s." The more so, also, seeing that it was precisely the economy in coal and water consumption, in the 1925 and 1926 exchange trials, that brought the G.W.R. "Castles" into prominence as compared with contemporary L.N.E.R. and L.M.S.R. express locomotive classes.

A rather more amusing reference in this criticism is the condemnation of the "V2" as "not a modern type," in comparison with other classes which figured in the 1948 exchanges, of which the L.M.S.R. Class "5" 4-6-0 is mentioned specifically. Mr. Savill might have done well to look up the dates at which the designs of the engines used in the 1948 express passenger and mixed traffic exchanges were first built. He would have found the chronological order to be: G.W.R. "King" 1927, G.W.R. "Hall" 1928, L.M.S.R. Class "5" 4-6-0 1934, L.N.E.R. "A4" 4-6-2 1935, L.M.S.R. "Duchess" 1937, Southern "Merchant Navy" 1941, L.N.E.R. Class "B1" 4-6-0 1942, L.M.S.R. converted "Royal Scot" 1943 (though *British Legion* of 1935 might really represent the beginning of this class), and Southern "West Country" 4-6-2 1945. So the "not a modern type" L.N.E.R. "V2" of 1936 actually is a *later* design than four of the foregoing, the L.M.S.R. Class "5" included!

As to unlimited availability, one cannot help wondering if this has not become so much of a fetish in present days that there is a risk of losing on the roundabouts what has been gained on the swings. The design of any engine intended for such universal service must be limited by two extremes—the smallest clearances and the maximum permissible weights of the most restricted routes over which it is to work. That is to say, a design of which nearly 800 examples have now been built, for service all over the country—the London Midland Class "5" 4-6-0—is severely tied down by the limitations of a few corners of the late L.M.S.R. system. Though I should be the last to disparage the amazing versatility of these engines and the magnificent work of which they are capable, it would be interesting to know how much of the aggregate economies

resulting from standardisation may be offset, say, by such inflated expenses as the double-heading which is necessary with Class "5s" between Perth and Inverness, which means, of course, two crews as well as two engines. Conversely, I wonder how the L.N.E.R. would have succeeded in handling its main line traffic between Kings Cross, York, Edinburgh, and Aberdeen if during the war years and after all the "V2" 2-6-2s had been universal-radius-of-action "B1s" instead?

It is possible, too, that some of the duties assigned to the very numerous 6 ft. and 6 ft. 2 in. 4-6-0s may be well beneath their tractive capacity; though this is of minor importance provided that it results in a maximum of use. Nevertheless, I would contend that a case undoubtedly exists for an additional modern general purpose locomotive of higher tractive power than the L.M.S.R. Class "5" or the L.N.E.R. "B1," and that such a need is met by the L.N.E.R. "V2s," and, in a more modernised form, by the Southern "West Country" and "Battle of Britain" 4-6-2s. Equally there seems to be a case for the intermediate type of express passenger 4-6-0, such as the G.W.R. "Castle," especially if the campaign now being pursued by *The Railway Gazette* for "Shorter trains and more of them" should bear fruit, in which event some at least of the Pacific scale of power would be superfluous apart from substantial accelerations.

Before discussing the concluding sentences of Mr. Savill's letter, I will quote from a communication received by the Editor from Mr. G. Aspinall, which bears on the same point. In the July-August issue I commented adversely on the contention expressed by a writer in a contemporary that the usefulness of the recent locomotive exchanges would be small. Mr. Aspinall claims that I contradicted myself by calling attention to the effect on the times and speeds of the runs resulting from different methods of driving and from the attitude of pilotmen, not to mention the difference between the work of one fireman and another. "With all these factors affecting the results," Mr. Aspinall continues, "I venture to agree with the writer of the article criticised by Mr. Allen, and would even say that the results will really be of little honest use even to those who have access to all information on costs, coal consumption, and so on."

If this is really so, why in the world should the Railway Executive have caused the Regions to go to the immense trouble, not to say expense, of this large-scale exchange of engines and crews, the occupation of pilotmen, inspectors, and three dynamometer cars and staffs for three months, and the disturbance of normal engine and crew rosters? This brings me back to the concluding part of Mr. Savill's letter. He claims that coal and oil are "the paramount factors" in locomotive performance. To this claim I would venture to put a direct negative. In my judgment *the* paramount factor in passenger locomotive performance is the obligation of the railways to the public as expressed in the timetables, a fact which on some main lines in my view seems very largely lost sight of at the present time. In this connection it is not without significance that during the recent exchanges it was the locomotives of the Southern Region, whose timekeeping is exemplary, that put up some of the most consistently fine performances on the foreign lines; equally, some of the most stirring exploits of the visiting engines were on Southern metals, because the Southern pilotmen were imbued with the same tradition.

Moreover, Mr. Savill still seems to be ruled by the outdated "coal per mile" complex, whereas if the investigations had been in search of no more information than that, with the related consumption of water and oil, why go to the expense and trouble of using the dynamometer cars and their staffs? As I have endeavoured to point out, and as I have confirmed by conversations with dynamometer car staffs, the enquiry has been into *the output of locomotive power* in relation to coal, water and oil consumption, and to the costs of construction and maintenance. The power is that measured by the dynamometer car at the drawbar of the engine, and I venture to think that the most reliable results are less likely to be obtained if the engine under test is putting out the very minimum of effort, with little attempt to keep time on easy present-day schedules (if time has been lost by circumstances not under the driver's control) than if the crews concerned are trying to get the best they know out of the machine in their charge, as was brilliantly demonstrated on not a few of the test runs.

It is impossible to claim, of course, that

a series of tests such as those just concluded can have any more than a limited value; but it would be equally impossible to accept Mr. Aspinall's contention that they are practically valueless. Coal, water, and oil consumption figures in relation to drawbar h.p. output have been obtained for each class under test in an extraordinary variety of running conditions. The present writer is not entirely without information, as Mr. Savill would appear to imagine, on what the various consumptions were, and though figures supplied in confidence will not be made public in these columns, they are of no small help in assessing the relative merit of the actual performances.

Nevertheless, it is a pity that such an iron curtain must be erected round a matter of such general interest and importance. In retrospect, I fancy that the publication by the *Great Western Railway Magazine* of the relative coal consumptions of the "Castles" and the Gresley Pacifics after the historic exchange of 1925 did no small amount of good in bringing into the limelight the soundness of Swindon principles of design at that period; the misfortune was the somewhat unfair way in which the figures concerning the timekeeping of the two types of engine were presented in the same article. If certain locomotive designers in Great Britain have been more successful than others, why must the fact be shrouded in secrecy? *Palmam qui meruit ferat* is still as sound a principle as when the Romans first coined the expression.

There is yet another reason, not capable of reduction to precise figures of profit and loss, why the exchanges have been of undoubted advantage. They have helped to break down the wall of parochialism between railways and regions. Drivers, firemen, inspectors, shed staffs, and many other railwaymen, have had the opportunity of seeing at close quarters the design, equipment, and performance of locomotives other than their own. Moreover, it is not merely that this intimate review of the practice of other railways has created unbounded interest, as it certainly did; but on many journeys it was clear that the visitors, both engines and crews, surprised their hosts very considerably. Exceptionally difficult stretches of line, to which it was thought that nothing but the home motive power and the skill born of long experience were adequate, were negotiated with easy competence by complete strangers. The fact that some of the competing engines were more completely equipped than others, whether for shed work, for running, or for the comfort of their crews, could not escape attention and pointed comment. So there came about much locomotive education and enlightenment, and also a new measure of mutual respect, that cannot but prove of advantage in the days to come.

Not until the Rugby testing-plant is complete will it be possible to conduct comparative locomotive tests in completely unvarying conditions, though not even a testing-plant reaches absolute finality in the results that it gives. For certain running characteristics are absent, such as the automatic shaking of the firegrate resulting from the vibration of an engine when in motion. Road comparisons, such as those recently made, also are necessary to provide complementary data in normal running conditions. So the 1948 locomotive exchanges, though limited in scope and in the conclusiveness of the information that they have provided, have been worth making; and as an outside observer I should have been sorry to miss the opportunity of participation in journeys which in many cases were of quite extraordinary interest.

Before leaving the exchanges, I ought perhaps to mention that the book on the subject announced in my last article must not be confused with another and much larger book of which an advertisement appears in the present issue. Reference to the latter is perhaps appropriate in these columns, for as is implied in its title, "Locomotive Practice and Performance in the Twentieth Century," the volume is designed expressly to serve as a handbook to the "British Locomotive Practice and Performance" series in *The Railway Magazine*.

For the benefit of readers who wish a full understanding of the technical terms which crop up constantly in articles of this description, there are chapters explanatory of modern locomotive development, design, building, testing, maintenance, and handling; these are followed by a series of chapters on locomotive performance, in which have been collated descriptions and tabular details of many of the most famous runs of past history, both British and overseas, hitherto

accessible only to those who have had files of *The Railway Magazine* going back many years; electric and diesel-electric propulsion are dealt with in detail; and there is a final chapter on methods of train timing. It is hoped that many readers of these articles will find in this book a "companion" which will add further to their understanding and enjoyment of a fascinating subject.

I have now a piece of news that will be of interest to many who take records of locomotive performance. For some time past I have been puzzled by the fact that the speeds of trains out of Kings Cross almost invariably fall slightly up the final stretch from Potters Bar North Tunnel to Potters Bar Station. I therefore approached the Civil Engineer, Eastern Region, to ask if the northern portion of the original 1 in 200 had become modified in any way. He kindly had some check levels taken, with very interesting results. From the south end of the tunnel the gradient is now 1 in 301 for 600 ft., followed by two equal lengths —1,200 ft. each—of 1 in 206 and 190 to the north end, which approximates closely to a 1 in 200 average. From the north end to the station, however, the inclinations are 1 in 148 for 600 ft., as steep as 1 in 125 for 360 ft., and then 1 in 185 for 1,320 ft. This steepening to an average of 1 in 165 for nearly half-a-mile would be quite sufficient to account for the slight reduction of speed. Such modifications of gradients with the passage of time, of course, are of no uncommon occurrence, and have taken place in all parts of the country, for various reasons.

One cheerful feature of the winter timetables is that start-to-stop schedules which closely approach the mile-a-minute rate are beginning once again to appear in the timetables of those Regions whose permanent way has been restored to first class running order. As in years long past, pride of place appears to be taken by the North Eastern Region, which now has six bookings daily, including some heavy expresses, over the 44.1 miles from Darlington to York in 45 min., at 58.8 m.p.h. start to stop. There is also a run over the 30 miles from Northallerton to York in 31 min., at 58.1 m.p.h. Next probably comes the Forfar-Perth run of the southbound "Postal" in the Scottish Region, 32.5 miles in 34 min., at 57.5 m.p.h. Incidentally, the 4 a.m. from Glasgow Central to Aberdeen, which at long last has broken loose from the northbound "Postal" for the whole of its journey, is allowed only 35 min. from Perth to Forfar (55.6 m.p.h.) despite the climb out of Perth. The best effort on the London Midland Region is probably that of the 8.10 a.m. from Windermere to Manchester, which covers the 19.1 miles from Oxenholme to Lancaster in 20 min. (57.3 m.p.h.), though this is mainly over downhill or level track.

At the other end of the scale, however, it is disappointing to see the Southern Region still make no cut whatever in the West of England times which operated through the worst of the war period, and especially in the 103 min. allowance of the "Atlantic Coast Express" over the 83.8 miles from Waterloo to Salisbury, which all the visiting drivers found it acutely difficult to spin out when the exchange tests were in progress.

From time to time, the observer of locomotive performance is compelled to revise the first opinions that he has formed of the capabilities of some new type of locomotive. Sometimes the early promise of exceptional feats on the road has not been borne out by later consistency of running as a whole; such was the case, for example, with the "Claughton" 4-6-0s of the one-time London & North Western Railway. In other cases, the work of locomotives has been transformed completely by later modifications, of which a better example could not be found than the Ivatt Atlantics of the Great Northern after superheating. But the most interesting case, perhaps, is that of the new locomotive class whose potentialities do not come to light until the engines come into the hands of expert and enthusiastic crews, and with little doubt the L.N.E.R. "B1" class 6 ft. 2 in. 4-6-0 falls within this category. Leicester crews on the Great Central main line of the Eastern Region, as we saw last month, are getting some brilliant work out of these engines; and, as I have sampled over a recent weekend, Great Eastern enginemen also are producing some most lively work with these new mounts.

On a Saturday in September, I went down to Ipswich on the 3.40 p.m. train, loaded to 12 bogies of heavy stock, 405 tons tare and 430 tons gross, and headed by No. 61044, looking delightfully spick-

and-span in the new standard black livery with the old L.N.W.R. lining out. The exit from Liverpool Street is still hampered by severe slowings for engineering work, which beset us from Bow Junction to Stratford. Incidentally, I always thought that the track rearrangement due to electrification would have taken the expresses through the old Local line platforms at Stratford, which would have given them a 40 m.p.h. run through, instead of the previous 25 m.p.h. of the through lines; but this has not been done, and the present curve in the fast lines at this point seems even worse than before.

So it was that we took 10 min. 50 sec. to Stratford, 4 miles; 16 min. 8 sec. to Ilford, 7.3 miles; 19 min. 30 sec. to Chadwell Heath, 10 miles, and 25 min. 37 sec. to Harold Wood, 15 miles. Up the 1 in 390-435 from Seven Kings, speed fluctuated between 49 and 50 m.p.h., and Brentwood bank, 3¼ miles averaging 1 in 103, was surmounted with a minimum speed of 23½ m.p.h. on the steepest pitch (1 in 85). The time out to Ingrave summit (19¼ miles) was 32 min. 50 sec., and we were through Shenfield, 20.2 miles, in 34 min. 16 sec. From there on, the "B1" ran with great freedom, touching 71½ m.p.h. before a 50 m.p.h. slack through Chelmsford, 69 at Witham and again at Stanway, with a fall to 57½ up 2 miles at 1 in 222 from Kelvedon.

There was a long slack to 40 m.p.h. through Colchester, with recovery to be made up 1¾ miles at 1 in 123-144 to Parsons Heath (where the speed was 36 m.p.h.); then followed 70½ m.p.h. through Manningtree, while the long rise past Bentley, including 3 miles at 1 in 145-157, was topped at just under 50 m.p.h. From Shenfield to Chelmsford, 9.5 miles, took 8 min. 53 sec.; from there to Witham, 8.9 miles, 9 min. 28 sec.; on to Marks Tey, 8 miles, 7 min. 37 sec.; and even with the Chelmsford slack and the long slow approaching Colchester, we had run the 31.5 miles from Shenfield to Colchester in 31 min. 39 sec. From Colchester to Manningtree, 7.8 miles, took 9 min. 42 sec., and the 5.5 miles from Manningtree up to milepost 65 occupied 5 min. 38 sec. So we came to a stand at Ipswich in 86 min. 1 sec. from Liverpool Street, 68.7 miles, exactly 4 min. ahead of time.

Two days later I travelled by the new "Norfolkman" express, on its inaugural run, made up to nine vehicles of 298 tons tare and 315 tons gross, and headed by No. 1236. This was a much easier proposition. With the same slowings as before until we were through Stratford, No. 1236 reached 54 m.p.h. at Ilford and 57½ m.p.h. at Harold Wood, while Brentwood bank was climbed with no lower minimum speed than 37½ m.p.h. Consequently, passing Stratford in 9 min. 38 sec., Chadwell Heath in 17 min. 29 sec., and Harold Wood in 22 min. 52 sec., we were over Ingrave summit in 28 min. 35 sec., and through Shenfield in 29 min. 50 sec.—the first occasion on which I have timed less than half-an-hour to this point for many years past. Keeping time was now simplicity itself, of course; with the same Chelmsford and Colchester slowings as before we took 39 min. 33 sec. to Chelmsford, 49 min. 5 sec. to Witham, 62 min. 54 sec. to Colchester, 72 min. 42 sec. to Manningtree, and stopped in Ipswich in 83 min. 47 sec., 1¼ min. early.

A return journey on the "East Anglian," with a train of 284 tons tare and 305 tons gross, proved very interesting. Up the 2 miles at 1 in 125 from Halifax Junction to Belstead, the engine, No. 61332, was not extended, and we fell to 33 m.p.h., but from there onwards there was some very fast running. Speeds were 72½ m.p.h. through Manningtree, 50½ minimum up the subsequent 2½ miles at 1 in 134, a slowing to 53 through Colchester, 48 at the top of Lexden bank, 70½ through Kelvedon which we increased on the level to 72½ through Witham, 64½ minimum (up 2 miles at 1 in 178) before Hatfield Peverel, and 72½ again on but little easier than level track before New Hall. So we passed milepost 65, 3.7 miles, in 7 min. 47 sec.; Manningtree, 9.2 miles, in 13 min. 28 sec.; Colchester, 17 miles, in 21 min. 9 sec.; Marks Tey, 22 miles, in 26 min. 55 sec.; Witham, 30.1 miles, in 34 min. 25 sec.; New Hall, 36.6 miles, in 40 min. 13 sec., and Chelmsford, 39 miles, in 42 min. 34 sec., having run the 35.3 miles from milepost 65 in 34 min. 47 sec. a fine piece of work. After that we had no further need to hurry, but despite a bad permanent way slowing between Brentwood and Harold Wood, just where high speed might have been expected, and further checks as we approached London, we were into Liverpool Street in precisely the 85 min. booked, to the very second.

Footplate Experiences Between Waterloo and Plymouth

By J. L. FLUKER, M.A., M.B., M.R.C.P., D.P.H.

BY the kindness of Mr. O. V. Bulleid, Chief Mechanical Engineer, Southern Railway, I was privileged in 1946, to make some journeys on the footplate of the "Merchant Navy" and "West Country" classes of streamline Pacifics. The down journey was made on the 10.50 a.m. from Waterloo, and in the reverse direction on the 12 p.m. *ex*-Plymouth Friary.

On the 10.50 a.m. down, 4-6-2 No. 21C15, *Nederland Line* was in splendid condition and in the hands of her regular crew. The locomotive in consequence presented a praiseworthy example of cleanliness, and every fitting on the cab was brightly polished. As is well known, the cabs of these engines are luxurious judged by ordinary footplate standards, and the sliding roof maintains an equable temperature, although responsible for a certain amount of dust. The smoothness of the riding is almost incredible, except in the electrified area, and it was generally possible to write in comparative comfort at speeds of 75 m.p.h. This particular engine was blowing off at about 270 lb., and throughout the trip pressure was maintained at about 260 lb.; the coal consumption did not appear to be heavy. Incidentally, the position of the regulator handle is rather misleading at first sight,

SOUTHERN RAILWAY. WATERLOO-SALISBURY. 10.50 a.m. APRIL 9, 1946
Engine "Merchant Navy" class 21C15. *Nederland Line*. Load 16 bogies. 516 tons tare and 560 tons gross
Driver A. Thorne; Fireman Stuckey (Nine Elms)

Miles		Min.	Sec.	m.p.h.	Cut-off (per cent.)	Steamchest and boiler pressures	
0.0	WATERLOO	0	00	—	75	260-80	260
1.5	Vauxhall	4	08	—	23	215	,,
		p.w.s.		15	,,	Nil	245
3.9	Clapham Junction	8	35	—	25	200	270
7.3	Wimbledon	12	57	—	20	160	265
12.0	Surbiton	17	55	62	,,	145	260
13.3	Hampton Court Jc.	19	07	65	,,	,,	270
14.4	Esher	20	07	67	,,	,,	260
17.1	Walton	22	36	63½	,,	160	,,
19.1	Weybridge	24	33	61	,,	,,	,,
21.7	Byfleet	26	52	66	,,	155	,,
		Sigs.				Nil	270
24.4	Woking	29	47	49	,,	170	260
28.0	Brookwood	34	04	49	,,	,,	,,
31.0	Milepost 31	37	45	49	,,	,,	,,
33.2	Farnborough	40	10	62	,,	160	270
36.5	Fleet	43	21	64	,,	150	260
39.7	Winchfield	46	24	68	,,	160	,,
42.2	Hook	48	38	63/69	,,	,,/145	270
		Sig.	stop			Nil	
					75	195	255
47.8	Basingstoke	60	03	—	25		
50.3	Worting Jc.	65	11	34	,,	150	260
52.4	Oakley	68	35	44	,,	140	270
55.6	Overton	72	31	57	23	130	,,
59.3	Whitchurch	76	02	67	,,	120	260
						30	,,
61.1	Hurstbourne	77	42	72	,,	125	,,
62.5	Milepost 62½	—	—	70	,,	10	255
						Nil	,,
66.4	Andover Junction	82	02	73	,,	140	,,
69.8	Milepost 69½	—	—	67	,,	,,	260
71.5	,, 71¼	—	—	62	,,	190	270
		Sigs.		49/46½	,,	Nil	265
72.8	Grately	88	23		,,	190	260
75.7	Amesbury Jc.	91	45	62	,,	150	265
						Shut	,,
78.3	Porton	94	13	70	,,	10	,,
82.7	Tunnel Jc.	98	13	Slack	,,	Shut	,,
83.8	SALISBURY	100	42	—	,,	160	245

Net time, 89½ min.

and in all engines, when it appeared to be only about two-thirds open, the steam-chest and boiler pressures were equal. Most of the drivers preferred to vary the power output by altering the regulator openings rather than the cut-off positions.

On the day in question the weather was glorious, the load of 560 tons substantial, and my only regret was the leisureliness of the 103-min. schedule to Salisbury—unjustified in view of the achievement of a net time of 89½ min. The start was troublesome and we slipped badly. Full forward gear was used and attempts to get under way with steamchest pressures of 260 lb., 140 lb., and 160 lb. failed owing to violent slipping; eventually we crept out of the terminus with only 80 lb. in the steamchest, which had been increased to 215 lb. by Vauxhall where the cut-off was brought back to 25 per cent. After a p.w.s. to 15 m.p.h., a steamchest pressure of 200 lb. was used as far as Wimbledon where the cut-off was fixed at 20 per cent., and the pressure was reduced first to 160 lb., and then to 145 lb. by Malden. Speed rose to 62 m.p.h. by Surbiton, and 67 m.p.h. at Esher and a modest increase to 160 lb. took us over the slight rise past Walton at 61, while at Byfleet the maximum was 66 m.p.h. At Woking, signals showing double yellow necessitated a speed reduction to 49 m.p.h., and a steamchest pressure of 170 lb. maintained this unvaryingly up the long 1 in 300 to milepost 31 and increased the rate to 62 m.p.h. by Farnborough. From here, roughly 150 lb. was needed for speeds of 68 at Fleet, 63 before and 69 beyond Hook, after which adverse signals brought us to a dead stand outside Basingstoke.

The re-start was again troublesome. We had stopped on a dead centre, and after setting back we slipped badly on three successive attempts to get on the move with 75 per cent. cut-off and steamchest pressures respectively of 215 lb., 190 lb. and 170 lb., the last of which eventually got us away. At Basingstoke, the cut-off was fixed at 23 per cent., but by Battledown the speed was only 34 m.p.h. Down the five miles of 1 in 550 from Overton to Whitchurch, 125 lb. of steam raised the speed to 67 m.p.h., and down the 1½ miles of 1 in 194 to Hurst-bourne only 30 lb. sufficed for a maximum of 72 m.p.h. The modest rise to milepost 62½ was breasted at 70 m.p.h. with 125 lb., and Andover was passed at 73 with steam practically shut off. Following a reapplication of steam to 140 lb., speed was still 67 m.p.h. at milepost 69½ after two miles up at 1 in 220 and one down at 1 in 330, and after a further 1½ miles up at 1 in 264, the pressure was increased to 190 lb. for the 3 miles at 1 in 165. Yet when an adverse distant signal was sighted at Grateley, speed was still 62 m.p.h. Fortunately, all the other signals were off, so that speed was not reduced below 50 m.p.h., the final minimum being 46½ m.p.h. with 190 lb. of steam. Down Porton bank, with practically closed regulator, speed did not exceed 70 m.p.h. In the end, after a late start of ¼ min., Salisbury was reached 1¾ min. early, but the net time was only 89½ minutes. A more enthusiastic crew than Driver Thorne and Fireman Stuckey could hardly be imagined.

Nevertheless, the most memorable part of the trip was still in store, and was provided by 4-6-2 No. 21C3, *Royal Mail*, with Driver Lethbridge and Fireman Turner in charge. The load was now 15 bogies, 484 tons tare and 525 tons full. Starting with the full 75 per cent. cut-off and only 110 lb. of pressure, we got away without an atom of slip, if a little slowly. At milepost 85 at the top of the 1 in 115, where the speed was 23 m.p.h., cut-off was reduced to 30 per cent., and about two miles beyond Wilton to 25 per cent., while the steamchest pressure was increased from 200 lb. at Wilton to 230 lb. at Dinton, and 245 lb. at Tisbury. Speeds were 64 before and 60 m.p.h. after Dinton, and no less than 65 m.p.h. on the level beyond Tisbury. Finally, with 255 lb. of steam—boiler pressure was 265 lb.—we swept up the 1½ miles at 1 in 270, and 2 miles at 1 in 145 at the astounding minimum of 57 m.p.h. Once over the Summit, steamchest pressure was rapidly reduced to 80 lb., and cut-off to 20 per cent., but we dashed through Gillingham at 82 m.p.h.

With less than 70 lb. of steam, speed fell rapidly up the two miles at 1 in 300-100 to Buckhorn Tunnel, the minimum being 54 m.p.h., and did not exceed 69 at Abbey Ford. At Templecombe cut-off was increased to 25 per cent., and 230 lb. of steam was allowed, giving a minimum of 44 m.p.h. on the bank (2⅓ miles at 1 in 100-80). After Milborne Port, with 20 per cent. cut-off and 75 lb. of steam,

speeds were 75 m.p.h. at Sherborne and 64 at Yeovil, but a severe p.w.s. to 15 m.p.h. at Sutton Bingham cost at least 4½ min., and milepost 126 was passed at only 25 m.p.h. though with but 110 lb. of steam. At about milepost 128, steamchest pressure was increased to 245 lb., and at Crewkerne both steamchest and boiler pressures were 260 lb., the cut-off being changed to 25 per cent. This gave speeds of 65 m.p.h. before and 38 m.p.h. after the 2¾ miles at 1 in 80 of Crewkerne bank.

From Hewish to Axminster, 18 per cent. cut-off and 120 lb. of steam produced 72 m.p.h. by Chard and 79 m.p.h. beyond Axminster. After 1½ miles up at 1 in 100 to Seaton Junction, speed was 65 m.p.h., cut-off was increased to 23 per cent. and steamchest pressure to 250 lb. in readiness for the 4½ miles at 1 in 80. At milepost 150 speed was 44 m.p.h. and the cut-off was increased to 26 per cent., and at post 150½ to 36 per cent. At milepost 151 speed was 36 m.p.h., and cut-off 40 per cent., and steamchest pressure 260 lb., while the engine was truly arousing the echoes. Speed settled down now to a steady 30 m.p.h., and only just before the summit did slipping reduce the rate to 28 m.p.h. Unfortunately, this continued on the 1 in 132 in the tunnel so that pressure had to be reduced to 200 lb., and speed fell to 26 m.p.h.

SOUTHERN RAILWAY. SALISBURY-EXETER. 12.38 P.M. APRIL 9, 1946
Engine: "Merchant Navy" class No. 21C3, *Royal Mail*.
Salisbury to Sidmouth: 15 bogies, 484 tons tare and 525 tons full
Sidmouth to Exeter: 13 bogies, 420 tons tare and 455 tons gross
Driver Lethbridge; Fireman Turner. (Exmouth Junction)

Miles		Min.	Sec.	m.p.h.	(Cut-off per cent.)	Steamchest and boiler pressures	
0.0	Salisbury	0	00	—	75	110	265
1.5	Milepost 85	4	26	23	30	140	260
2.5	Wilton	6	38	—	,,	200	250
8.2	Dinton	13	12	64	25	230	,,
12.5	Tisbury	17	25	60/65	,,	245	260
						255	265
17.5	Semley	22	15	57	20	30/120/80	245
21.6	Gillingham	25	57	82	,,	68	250
23.9	Milepost 107½	27	55	54	,,	70	,,
26.2	—— 109¾	30	07	69	,,	90	,,
28.4	Templecombe	32	15	—	25	205	265
						230	270
30.0	Milepost 113½	34	13	44	,,		
30.9	Milborne Port	35	22	54	20	"75	260
34.5	Sherborne	38	57	75	,,	,,	,,
39.1	Yeovil Junction	42	51	64	,,	70	,,
		p.w.s				Shut	250
41.3	Sutton Bingham	47	05	15	,,	110	270
42.5	Milepost 126	49	50	25	,,	,,	
46.5	—— 130	55	05	65	,,	245	260
47.9	Crewkerne	56	24	54	25	260	260
						(Regulator ⅜ open on quadrant.)	
49.5	Milepost 133	58	32	38	,,	260	260
					18	90	240
55.9	Chard Junction	65	07	72	,,	120	
61.0	Axminster	69	13	79	,,	,,	250
64.2	Seaton Junction	71	56	65	23	250	265
66.5	Milepost 150	74	16	44	26	250	260
					36	,,	
67.5	—— 151	75	51	36	40	260	265
68.5	—— 152	77	45	30	,,	,,	270
69.0	—— 152½	78	47	28	,,	240	,,
70.0	—— 153½	81	01	26	,,	200	,,
71.2	Honiton	82	41	—	,,	190	250
					18	100	,,
74.5	Milepost 158	—	—	74	,,	,,	280
75.8	Sidmouth Junction	87	30	—	—	—	—
0.0	——	0	00	—	75	120	260
		p.w.s.		15	45	160	,,
1.7	Milepost 161	3	45	—	22	80	,,
						200	,,
3.7	Whimple	6	23	60	18	95	,,
7.4	Broad Clyst	9	34	75	,,	,,	240
9.3	Pinhoe	11	10	64	,,	140	,,
11.1	Exmouth Jc.	12	57	—	,,	200	220
		Sigs.					
12.2	Exeter	15	31	—	,,	Shut	,,

Net times, 82¾ + 15¼ = 98 min.

The final maximum before the Sidmouth stop was 74 m.p.h.—the brakes were just touched—and for this 100 lb. of steam and 18 per cent. cut-off sufficed. It was here that the safety valves were lifted for the one and only occasion on the whole trip. We were 3¼ min. early. From Sidmouth, with 75 per cent. cut-off and 120 lb. steam we made an excellent start without slipping, and with 18 per cent. and 95 lb. the final maximum at Broad Clyst was 75 m.p.h., the Exeter arrival being 3¼ min. early. When I stepped off the footplate, I felt that Driver Lethbridge had given me an unforgettable experience. From the foregoing it can be said without hesitation that, with these engines, a service on the lines of the "Silver Jubilee" or "Coronation" would be an easy matter, and I am convinced that their design and performances need not fear comparison with the leading types of any other British railway. Indeed, it may be long before they are surpassed.

West of Exeter, perhaps, the running may seem something of an anticlimax, and certainly except between Okehampton and Exeter, the route does not favour high-speed running. Nevertheless, the new "West Country" class should render both faster and heavier trains feasible. On this occasion, with a modest six-coach load of 205 tons gross, Driver W. R. Clarke and his mate, H. Passmore, achieved a net time of 34 min. from Exeter to Okehampton with ease, the schedule being 39 min. Starting in full forward gear with 85 lb. pressure, we got away well, pressure being increased to 180 lb. as far as Newton St. Cyres, the cut-off being fixed permanently at 28 per cent. From there to Yeoford speed fluctuated between 49 and 53 m.p.h., and steamchest pressures between 100 and 125 lb. Up Bow bank, three miles at 1 in 97-132-80, the minimum was 38 m.p.h. with 140 lb. of steam, and 60 lb. produced 55 m.p.h. on the brief descent to Bow. Up the 1½ miles at 1 in 100-80 to North Tawton, the minimum with 160 lb. was 49 m.p.h., and 110 lb. gave a rapid acceleration down the mile at 1 in 80 past the station to 65 m.p.h. Up two miles at 1 in 77, speed fell to 48 m.p.h. with 155 lb., but there was a p.w.s. to 15 m.p.h. at Sampford Courtenay. From Okehampton, the load was reduced to three coaches of 100 tons gross, and nothing of note ensued. The time for the 16 miles from Tavistock to Devonport which brought us in 4¼ min. early was 22 min. 15 sec. A quick finish with 62 m.p.h. at post 225½, 51 at St. Budeaux up ¾ mile at 1 in 75, and 55 at Ford was achieved with only 60-80 lb. steamchest pressure. There was ample time, therefore, to admire the magnificent moorland and river scenery, unsurpassed probably on any other line in England.

The up journey, made about three weeks earlier, was less fortunate. I shall not quickly forget the twinge of disappointment at Plymouth when I saw backing on to the train of 4 coaches (132 tons tare and 145 tons full) not the promised "West Country" Pacific but the ancient and grimy "Greyhound" No. 301 of Mr. Drummond's T9 class 4-4-0s. I recalled Mr. Cecil J. Allen's graphic description of a similar occasion at Salisbury in 1912 when he saw an engine of the same class, "diminutive" even for those days, backing on to the

SOUTHERN RAILWAY. EXETER-OKEHAMPTON. 2.51 p.m. FROM EXETER
Engine, "West Country" class No. 21C118. 6 bogies, 192 tons tare, 205 tons full
Driver, W. R. Clarke; Fireman H. Passmore (Exmouth Junction)

Miles		Min.	Sec.	m.p.h.	Cut-off (per cent.)	Steamchest and boiler pressures	
0.0	Exeter	0	00	—	75	85	280
1.4	Cowley Bridge Jc.	3	10	—	28	180	270
4.3	Newton St. Cyres	7	02	51½	,,	120	285
6.9	Crediton	10	08	49/53	,,	100	270
						125	280
10.6	Yeoford	14	40	49/52	,,	115	265
11.5	Coleford Jc.	15	53	47			
				38	,,	140	260
15.4	Bow	21	04	55	,,	60	280
18.5	North Tawton	24	28	49	,,	160	,,
				65	,,	110	270
21.3	Sampford Courtenay	27	51	48	,,	155	285
		p.w.s.		15	,,	Nil	270
25.0	Okehampton	36	12	——	,,	190	245

Net time, 34 min.