British Locomotive Practice and Performance.

By CECIL J. ALLEN,
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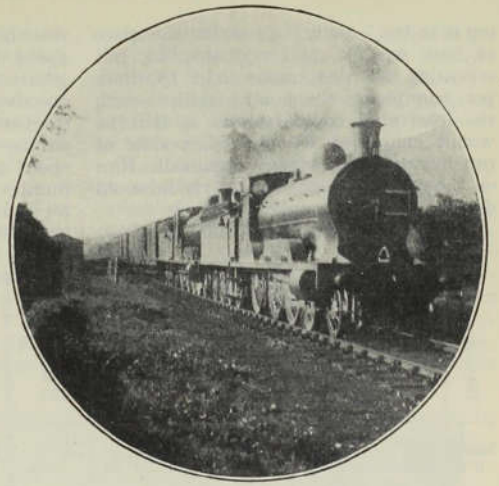

Photo.] [*A. B. Noble.*

LONDON MIDLAND AND SCOTTISH RAILWAY.

Perth-Inverness express near Aviemore.
Highland 4–6–0 locomotives Nos. 143 "Gordon Castle" and 146 "Skibo Castle."

AN enquiry which took place recently before the National Wages Board in connection with proposed alterations in railway scales of pay was productive of one of the most extraordinary statements in regard to locomotive working that I have ever heard made. We were told by an expert witness that the new express engines of the Great Western Railway, running at the rate of 83 miles an hour on some parts of the journey, would consume 50 lb. of coal per mile. By way of deduction, the speaker then assumed that if the fireman took up 2 lb. of coal on his shovel each time, it meant that when the train was going at that speed he would have to use his shovel 2,075 times an hour. If the train travelled at the rate of 64 miles an hour for the whole journey—which, he claimed, was what actually occurred—the fireman would have to use his shovel 1,600 times every hour. This evidence was in support of the contention that the work of the locomotive men had become 140 per cent. more exacting on account of larger engines, greater speed, and bigger loads. This statement was afterwards corrected to 4 lb. of coal per shovel, but the "amendment"—which, by the way, received in the daily newspapers the merest fraction of the notice they had bestowed on the original statement—in but little degree modified the original claim.

That the average physical labour of a fireman does not grow lighter under modern operating conditions is hardly a matter for dispute, but in what degree the advocacy of his case can be helped by so gross and, indeed, so perfectly ridiculous an exaggeration of the facts as this is a mystery indeed. In the first place, the fireman who puts his coal on the firegrate in 2-lb., or even 4-lb. numbers would appear to be qualifying for immediate admission to some institution catering for the mentally weak. In the second place, supposing we allow the amended 4-lb. in our calculations, 1,038 times per hour represents 17 times per minute and more than once every four seconds. If any human being could be discovered capable of taking a shovelful of coal from the tender, traversing it through some 6 ft. or so to the firehole door, depositing it in a suitable position in the firebox, withdrawing the shovel again and return

ing it to the "ready," all within the space of four seconds, and not only so, but repeating the dose more than 15 times per minute by the hour together—well, the least that could be said is that he would command a far higher rate of remuneration in some Cinquevalli turn on the music-hall stage that ever he could dream of on the footplate!

The fact of the matter is that the footplate shovelful of coal is, on the average, round about 9 lb. and not 2 or 4 lb., and frequently larger amounts, up to 12 lb. and 13 lb., are taken on the shovel as a matter of habit. Then, again, such a speed as 83 m.p.h. is rarely more than momentary, even on the Great Western Railway, and it would be absurd to take such a rate of travel as a basis of estimation of coal consumption, which, further, does not reach its maximum on the high speed stretches of line, but where the greatest demands are being made on tractive power, that is, on the adverse gradients. Yet again, there is no train in the country scheduled at an average speed of as much as 64 m.p.h., and the number at over 60 m.p.h., the majority for comparatively short distances, can be counted on the fingers. It is a matter of common knowledge to most of my readers that an average of as much as 55 m.p.h. to represent overall British running speeds over long distances would be on the high side. For the sake of argument, however, we will take 55 m.p.h. as our basis figure.

Now the Great Western locomotive authorities, I believe, estimate their general average coal consumption with the large 4-6-0 engines at somewhere about

SOUTHERN RAILWAY (SOUTH WESTERN SECTION), WATERLOO–SALISBURY.

Distance.	Engine No. .. / Driver .. .. / Load (axles) / ,, (tons tare) / ,, (tons full)	Schedule.	748 U Knight 32 230 245	748 U — 44 303 320	740 U Hancock 44 308 325	Distance.	Schedule.	740 U Cocker 28 197 210	446 D Payne 32 234 245	743 U — 32 234 245
Miles.		min.	m. s.	m. s.	m. s.	Miles	min.	m. s.	m. s.	m. s.
0·0	Waterloo ..	0	0·00	0·00	0·00	83·8	93	96·59 sig. stop	94·03 sigs.	fog.
1·4	Vauxhall ..	—	3·30	3·30	3·34	82·4	89	91·23	90·02	fog.
3·9	Clapham Junc.	7	7·00	7·15	7·22	79·9	85	87·45 sig. stop	86·25	85·55
7·3	Wimbledon ..	—	11·00	11·35	11·55	76·5	—	79·22 sigs.	82·17 sigs.	82·00 sigs.
12·1	Surbiton ..	—	16·00	16·55	17·38	71·7	—	72·42	76·50 sigs.	77·10
19·2	Weybridge ..	—	23·00	24·10	25·17	64·6	—	66·03	67·55	70·20
24·4	Woking ..	29	28·10	29·45	31·04	59·4	65	61·32	63·24	65·35
31·0	Mile-post 31 ..	—	35·20	37·55	39·32	52·8	—	55·23	57·20	sigs.
36·6	Fleet	—	40·40	44·00	45·40	47·2	—	50·08	51·56	52·15
42·3	Hook	—	46·10	50·10	51·52	41·5	—	45·03	46·44	47·00
47·9	Basingstoke ..	56	51·30	56·10	57·50	35·9	43	40·23	41·55	42·15
50·4	Worting Junc. ..	59	54·20 eased	59·10	60·59	33·4	—	38·13	39·45	40·00
55·7	Overton	—	60·30	65·25	67·18	28·1	—	32·48	34·39	34·15
61·2	Hurstbourne ..	—	66·20 p.w.r.	70·35	72·38	22·6	—	26·58	29·15	28·10
66·4	Andover Junc. ..	76	71·50	74·55	77·07	17·4	23	21·20	24·32	22·40
72·8	Grateley ..	—	80·30	81·05	83·32	11·0	—	15·44	19·05	17·05
78·3	Porton	—	86·20	87·05	89·35	5·5	—	9·00	10·24	9·35
82·7	Tunnel Junc. ..	—	90·00	91·00	* 93·07	1·1	—	3·04	3·33	3·45
83·8	Salisbury ..	93	92·15	93·10	95·25	0·0	0	0·00	0·00	0·00
83·8	Net times (min.)	93	88½	93¼	*95½	83·8	93	86¾	88¾	91

U: Urie 6-ft. 7-in. 2-cylinder 4-6-0. D: Drummond superheated 6-ft. 7-in. 4-cylinder 4-6-0.
* Schedule: 94 min.

38 lb. per mile. I do not know whether this includes lighting up and time standing, but in order to present the case quite fairly we will assume not; this exclusion will tend, anyway, to balance the fact that on the Great Western Railway the best Welsh coal is used of very high calorific value. Taking, then, an average of 38 lb. per mile, at 55 m.p.h., in 9-lb. instalments, we have, not 2,075 shovelfuls per hour, nor even 1,038, but 232! Not one shovelful every four seconds, but less than four per minute! And what generally happens, as most of my readers know, is that the fire-hole door is opened and half-a-dozen or more large shovelfuls are put on in succession, after which the fireman has a rest of a couple of minutes or so before attending to the fire again. The actual rate of firing is dependent, of course, on the relative arduousness of the work which the locomotive is called upon to perform, and varies with every train and every stretch of line. I have travelled on the footplate over some 31 miles of line continuously, that is, for over half-an-hour, without the fire being so much as touched, and although I grant that this was from Shap Summit down to Carlisle, the stretch of line concerned is by no means exclusively downhill, and the train concerned was on the fastest schedule of the day. Reverting to the Great Western Railway, I know for a fact that the 4-6-0 engines frequently run on such turns as the Bristol 2-hour trains for 10 miles or so without attention to the fire.

Most railways have some turns of duty on which the difficulty of firing is in excess of the average. As cases in point one might take the non-stop Plymouth journey of the Great Western *Riviera Limited*, the through London-Manchester working of a 4-4-0 *Director* for 4½ hours on the 3.20 p.m. London and North Eastern (Great Central) express out of Marylebone, such Great Northern "Pacific" duties as the immensely hard 5.45 p.m. out of King's Cross and the express arriving at 1.55 p.m., and on the Great Eastern section of the same group the brief but exacting 82-min. run of the 8.30 p.m. and 8.40 p.m. Continental boat expresses from Liverpool Street to Parkeston Quay. But such duties are, after all, in the minority. And nothing was said, in the presentation of this case, of the vast increases in locomotive efficiency which have accompanied the provision of the "larger engines," and whereby the 140 per cent. increase in combined speed and loads (if this figure has any foundation in fact) is borne

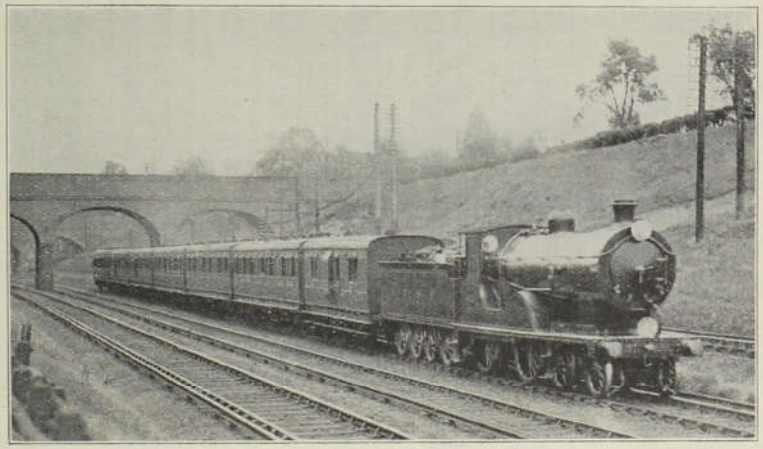

Photo. SOUTHERN RAILWAY. [*F. E. Mackay*

Waterloo-Salisbury train. London & South Western rebuilt 4–4–0 locomotive No. 423.

chiefly by the engine herself, rather than being passed on to the crew in the shape of more arduous labour. The worst of silly arguments such as the one with which I have just dealt is that our newspapers, as usual, give them prominence and adorn them with heavily-leaded headlines, with the result that the unfortunate public, who are not in a position to know anything different, accept the "truths" thus presented, and give them their complete credence.

I had hoped in the present article to find space for the discussion of two letters from correspondents, one in the far-away Argentine, dealing with the future development of express locomotive design in this country, and to illustrate the discussion with drawings representing the suggestions of these writers; but I must postpone this matter until next month, in order that I may have space in the present issue sufficient to describe my recent experiences on the South Western section of the Southern Railway. To my own journeys there have been added certain runs for which I am indebted to the kindness of three correspondents, the care exercised in whose work of record is evident in the detailed manner with which their logs have been framed. For myself, in making three return journeys on quite

SOUTHERN RAILWAY (SOUTH WESTERN SECTION). SALISBURY–EXETER.

Distance.	Engine No. .. / Driver .. .. / Load (axles) .. / ,, (tons tare) / ,, (tons full)	113 D Bailey 32 225 240	748 U Butler 32 230 245	744 U Butler — 289 310	748 U — 44 303 320	Distance.	703 D Burridge 32 227 240	Distance.	745 U Cooper — 394 415
Miles.		m. s.	m. s.	m. s.	m. s.	miles	m. s.	miles	m. s.
0·0	Salisbury ..	0·00	0·00	0·00	0·00	75·8	88·22	88·0	104·10
2·4	Wilton	5·40	5·00	5·53	5·20	73·4	85·01	85·6	100·41
8·1	Dinton	12·30	11·30	13·02	12·20	67·7	79·41	79·9	95·30
12·3	Tisbury ..	17·45	16·15	18·03	17·25	63·5	75·48	75·7	91·42
17·6	Semley	24·00	22·05	24·10	23·35	58·2	70·32	70·4	86·31
21·7	Gillingham ..	27·45	26·05	28·18	27·30	54·1	65·20	66·3	81·25
28·2	Templecombe ..	33·40	32·15	35·00	33·50	47·6	58·50	59·8	74·52
30·9	Milborne Port ..	36·45	35·05	38·08	37·05	44·9	55·53	57·1	71·57
34·2	Sherborne ..	40·10	38·20	41·49	40·10	41·6	50·43	53·8	66·38
38·7	Yeovil Junc. ..	43·50	42·10	46·12	44·35	37·1	46·20	49·3	62·10
42·5	Mile-post 126¼ ..	47·35	45·55	50·25	48·50	†34·7	†44·23	†46·9	†60·15
			p.w.r.						
47·6	Crewkerne ..	52·40	51·50	55·54	54·25	28·2	38·27	40·4	54·20
49·2	Mile-post 133 ..	55·10	54·05	58·30	57·00	26·6	36·43	38·8	52·37
55·7	Chard Junc. ..	61·30	60·10	65·21	63·40	20·1	27·48	32·3	43·43
					p.w.r.				
60·8	Axminster ..	65·30	64·10	69·55	69·15	15·0	20·32	27·2	37·31
							sigs.		
64·0	Seaton Junc. ..	68·10	67·05	72·53	72·25	11·8	17·33	24·0	34·32
66·7	Mile-post 150¼ ..	71·55	70·50	77·04	76·45	9·1	p.w.r.	21·3	p.w.r.
68·7	,, 152¼ ..	76·10	74·25	81·32	80·45	7·1	12·45	19·3	29·26
69·7	,, 153¼ ..	78·15	76·05	83·41	82·40	6·1	10·41	18·3	27·38
70·9	Honiton ..	79·45	77·35	85·17	84·10	4·9	8·28	17·1	25·15
			eased	p.w.r.					
75·8	Sidmouth Junc.	83·30	83·35	90·22	88·30	12·2	17·55	12·2	18·30
79·2	Whimple ..	86·25	5·20	94·05	92·10	8·8	12·01	8·8	12·41
82·8	Broad Clyst ..	89·15	8·10	97·25	95·25	5·2	7·50	5·2	8·22
86·5	Exmouth Junc.	92·35	11·45	101·22	99·30	1·5	3·30	1·5	3·48
			sig. stop						
88·0	Exeter	94·40	15·30	103·38	102·00	0·0	0·00	0·0	0·00
88·0	Net times (min.)	94¾	*91½	102½	100	88·0	18+85½	88·0	103

D: Drummond small 6-ft. 7-in. 4-4-0 without water-tube firebox.
U: 6-ft. 7-in. Urie 2-cylinder 4-6-0.
* Estimated on non-stop basis, Salisbury–Exeter. † Sutton Bingham Station.

casual occasions, I have been exceedingly fortunate in securing records, on both the Bournemouth and Exeter routes, which, in certain of their features, embodied some of the fastest South Western locomotive work that I have ever noted. I had no conversation with the drivers concerned, and, so far as I am aware, they had no knowledge whatever that their work was under observation. So casual was my chief Exeter journey, indeed, that I waited until the last day of availability of the facilities which I held, and then made a hurried decision to travel by the ordinary service. We were doing 50 m.p.h. at Clapham and 54 at Wimbledon, despite the rise between the two places; then we got up to 61 on the level at Surbiton, 65 on the faint descent to Esher, and after falling to 59 on the faint rise past Walton, the 1¼ miles at 1 in 330 past Weybridge brought us up to 66 m.p.h. The 10½-mile ascent from Byfleet Junction to mile-post 31 only brought us down to 55½ m.p.h., although it steepens gradually from 1 in 386 to 1 in 300, on which we steadily maintained the rate last mentioned. The next 6 miles are nothing

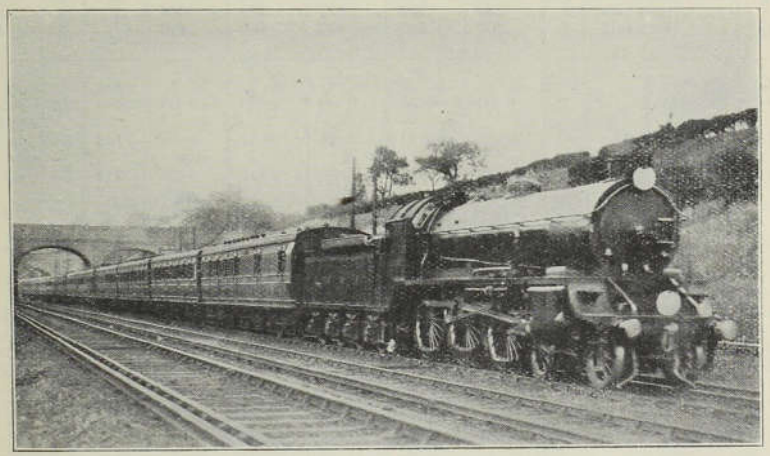

Photo.] SOUTHERN RAILWAY. *[F. E. Mackay.*

Down West of England Restaurant Car Express.
London & South Western 4–6–0 locomotive No. 736.

11¼ a.m. down, with startling results, as we shall see in a moment.

The first table deals with runs between Waterloo and Salisbury, of which that in the first column is the run just referred to; after this follow two runs on the same train with the summer loading, one of my own, and the other timed by a correspondent. Of the up runs, the first two were timed by friends, and the third, on the 4.36 p.m. up, by myself. The feature of Knight's effort in the first column was the extraordinary time of 51½ min. out to Basingstoke—certainly my own record, and to the best of my recollection the fastest I have ever seen recorded in easier than level, but we mounted to 65 m.p.h.; 3 miles at 1 in 337 past Winchfield did not suffice to bring us below 62½; the brief mile down at 1 in 386 after Hook brought us up to 67; and 4¾ miles up to Battledown Box at 1 in 249 gave a final minimum of 52½ m.p.h.

Thus to maintain an average speed of exactly 60 m.p.h. from Surbiton to Worting, over a route of which 23½ miles are uphill and 11½ level out of 38¼ miles in all, struck me as a notable piece of work. After that we were very materially eased, but the engine was opened out again after the Andover slack, and commencing the 4½ miles at 1 in 264-165 to Grateley at

53 m.p.h., we finished them at 46, and touching 76½ on Porton bank, we came to a stand at Salisbury over a minute inside time, despite a slow stop drawing up to the water column. The net time of 88½ min. cited is based on the loss by the Andover slack only; although 4½ min. under schedule, it could obviously have been cut further with great ease by a some style, reaching 60 at Whitchurch, 72½ at Hurstbourne "dip," and a momentary 80½ before Andover—the first time I have recorded an "eighty" with this type. But after a minimum of 45½ at Grateley we descended Porton bank chiefly at 69 m.p.h., only touching 74 briefly near the foot, so just keeping time. No. 740 touched 74 at Andover, fell to

SOUTHERN RAILWAY (SOUTH WESTERN SECTION), WATERLOO–SOUTHAMPTON.

Distance.	Engine 4-4-0 No. / Driver .. .. / Load (axles) .. / ,, (tons tare) / ,, (tons full)	Schedule.	419 d / — / 36 / 280 / 300	* 300 / Luke / 48 / 368 / 385	463 D & 740 U / Harding / — / 377 / 400	472 D / — / 52 / 379 / 400	471 D / Penton / — / 395 / 420	Distance.	Schedule.	470 D / Bullard / — / 416 / 440
Miles.		min	m. s.	m. s.	m. s.	m. s.	m. s.	miles	min.	m. s.
0·0	Waterloo ..	0	0·00	0·00	0·00	0·00	0·00	79·3	92	96·40
										sig. stop
1·4	Vauxhall ..	—	sigs.	3·41	3·14	3·51	4·00	77·9	88	91·07
							sigs.			
3·9	Clapham Junc. ..	7	10·10	7·22	6·30	7·42	9·23	75·4	84	87·46
							sigs.			
7·3	Wimbledon ..	—	sigs.	11·37	10·21	12·16	15·12	72·0	—	83·56
							sigs.			
12·1	Surbiton ..	—	20·00	16·51	15·21	17·49	23·15	67·2	—	78·30
					sigs.					
19·2	Weybridge ..	—	28·00	24·35	23·41	25·30	31·33	60·1	—	71·21
			p.w.r.							
24·4	Woking ..	29	34·55	30·11	28·42	31·25	37·12	54·9	64	66·38
31·0	Mile-post 31 ..	—	43·15	38·14	36·34	40·39	45·24	48·3	—	60·29
36·6	Fleet	—	49·05	44·12	42·11	47·15	51·35	42·7	—	54·57
42·3	Hook	—	54·50	50·07	47·38	53·39	57·34	37·0	—	49·41
47·9	Basingstoke ..	56	60·20	56·02	52·57	59·47	63·33	31·4	42	44·44
50·4	Worting Junc.	—	63·15	59·12	55·45	62·58	66·37	28·9	—	42·24
56·2	Litchfield Box ..	—	69·55	66·51	62·45	70·58	74·25	23·1	—	35·42
58·2	Micheldever ..	—	71·40	68·48	64·35	72·56	76·22	21·1	—	32·38
66·7	Winchester ..	—	78·35	76·45	71·44	80·54	83·45	12·6	—	20·16
73·6	Eastleigh ..	83	84·00	82·48	77·28	86·53	89·43	5·7	10	10·42
78·2	Northam Junc.	88½	88·15	87·22	82·54	91·04	sig. stop	1·1	3½	—
				sig. stop		sigs.				
79·3	Southampton W.	92	90·50	95·02	86·04	94·31	106·29	0·0	0	0·00
79·3	Net times (min.)	92	85	90	84¼	93¾	90	79·3	92	95

D: Latest Drummond type, superheated. d: Large-boilered Drummond type, superheated.
* Small-boilered Drummond type, superheated. U: 4-6-0 2-cylinder Urie type.

continuation of the Waterloo-Worting effort.

The next two runs were quite ordinary by comparison. Speeds were 51 and 50 m.p.h. at Wimbledon, 61½ and 60 at Byfleet Junction, 52⅝ and 49½ at Woking, 47½ and 45 at mile-post 31, 60 and 59 beyond Hook, and 47½ and 46 at Battledown; after this No. 748 got away in 45 at Grateley, and reached 79 on Porton bank; schedule in this case was a special one of 94 min., owing to a division of the train, and was not quite maintained.

In the up direction the fine run shown behind Driver Cocker, with No. 740, was beaten in its early stages by a finer one which I enjoyed behind the same driver, on No. 751, with a much heavier 36-axle

load of 270 tons. On this run we passed Tunnel Junction in 3¼ min. and Porton in 8¾ min., accelerating to 49½ m.p.h. and then dropping back to 48 on the 1 in 169, and only falling to 46 on the 1 in 140, while on the 1 in 245 to Amesbury Junction we worked up to 52½, and up the ensuing 1 in 735-440 to Grateley to 57½ m.p.h. The total length of this bank is 9½ miles, of which the steepest part is 2⅝ miles at 1 in 169, 1¼ at 140 and 1¾ at 245, Porton being on the middle 140. Descending to Andover, we touched 75 m.p.h., then fell to 55½ up the 3¼ miles following at 1 in 178; Hurstbourne

heating, and so we had to stop at Basingstoke (in 39 min. 50 sec. from Salisbury, 35·9 miles, after a preliminary signal check) to detach the offending vehicle. This was to me a great disappointment, as, knowing the record of Driver Cocker as I do, I felt sure we were in for an exceptional trip. As it was, in order to save time I changed into the immediately following Bournemouth train, whereon No. 751 made a very fair run to Surbiton, 35·8 miles, in 38 min. 35 sec., start-to-stop, with maxima of 70½ m.p.h. at Woking and 67 at Walton.

The first of the three up journeys, on

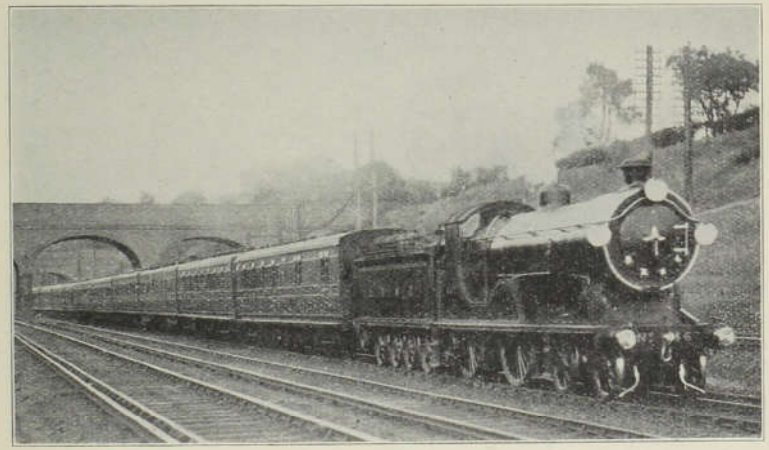

Photo.] SOUTHERN RAILWAY. [*F. E. Mackay.*

Down Bournemouth Restaurant Car Express.
London & South Western rebuilt 4–4–0 locomotive No. 467.

"dip" brought us up to 64½ and down again to 59 m.p.h., after which we maintained steadily a speed of 60-61½ right up the 1 in 550 which extends for 6½ miles from Whitchurch to Oakley.

As a result of this really magnificent running we passed Grateley in 15 min. 10 sec., Andover in 20¾ min., Hurstbourne in 26 min., Overton in 31 min. 35 sec., and Worting Junction in 36 min. 55 sec., with excellent prospects of passing Basingstoke in 39 min. (a gain of 4 min. on schedule after a late start), and of achieving "even time" later on in the journey. But it was not to be. An axle-box on the leading coach began to display serious signs of which Cocker was again the presiding genius, was quite good, but the load was much lighter. Speeds were 75 m.p.h. before Andover, 50 minimum before Hurstbourne, and a gradual acceleration to 60 at Overton; then 76½ beyond Basingstoke, falling away to 59 at mile-post 31; and 72½ beyond Woking. With the times of the run last described as far as Worting, added to these from Worting to Surbiton, the latter station, 71·7 miles, would have been passed in 71 min. 20 sec.; as it was, "even time" was within measurable distance of realisation had it not been for the usual succession of checks in the London area.

On the next two runs one of the rebuilt 4-cylinder Drummond engines was matched against a 4-6-0 of the Urie type, with identical loads. The former did poorly up to Grateley, falling to 31½ m.p.h. on Porton bank against 743's minimum of 40; but then the positions were absolutely reversed, the maxima at Andover being 79 and 75 m.p.h., the minima before Hurstbourne 59 and 51 m.p.h., and the maintained speeds up to Oakley 64 against 55 m.p.h.—in fact, No. 446's time of 17 min. 23 sec. for the 18·5 miles from Andover to Basingstoke was remarkable altogether. Speeds were 76½ and 74 m.p.h.

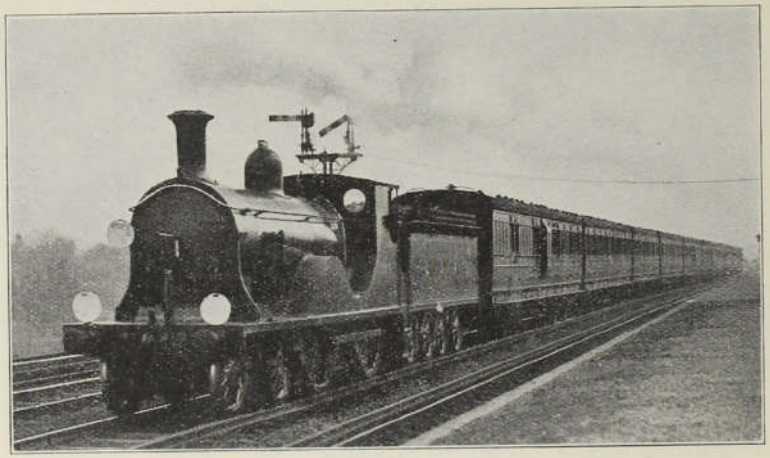

Photo.] SOUTHERN RAILWAY. [*F. E. Mackay.*

Down Portsmouth express. London & South Western 4-4-0 locomotive No. 312.

beyond Basingstoke; No. 743 passed Farnborough at 65 m.p.h., but then got signals on, while No. 446 passed mile-post 31 at 57½ m.p.h.; then followed 71½ and 70½ m.p.h. beyond Woking, and the usual concluding delays on both runs. As regards these up runs it may be noted that No. 740 covered the 60·7 miles from Grateley to Surbiton in 56 min. 58 sec., and No. 446 reeled off the 53·6 miles from Grateley to Weybridge in 48 min. 50 sec., the latter representing an average speed of all but 66 m.p.h. for over 50 miles.

And now for the Salisbury-Exeter journeys. The profile of this mountainous route appeared in my November, 1921, article, which was doubtless sufficiently recent for most readers to have it ready to hand. In the first column is tabulated my memorable run with Bailey on No. 113—a Drummond early 4-4-0—which I have shown alongside Butler's effort on No. 748, the latter continuing the remarkable achievement of Knight with the same engine between Waterloo and Salisbury. The third down journey was timed by a correspondent and the last by myself, Nos. 2, 3 and 4 representing one winter and two summer trips on the 11 a.m. down.

By comparing the details of the first and second runs with the profile, it will be seen at once that No. 748 beat the 4-4-0 on all the up grades, as is, of course, to be expected, while the 4-4-0 was slightly the faster downhill. This is not to say, however, that the 4-6-0 was unwilling to show her paces, as we worked up to three "eighties" in a distance of less than 50 miles, 80½ being reached at Sherborne, at Chard Junction and also at Broad Clyst, while we attained 71½ at Gillingham (this was the only bank as far as Honiton on which we slackened severely), 77½ before Templecombe, and kept up 76½–77½ most of the way from Chard Junction to the foot of Colyton bank, beyond Axminster.

From Honiton Tunnel down to Sidmouth Junction, however, we did not so much as touch 60 an hour, time being so well in hand. By contrast No. 113 was doing 77½ m.p.h. at Gillingham, 76½ before Templecombe, 80½ at Sherborne, and 80 at Axminster, while 82 m.p.h. was the maximum reached before Sidmouth Junction and 86½ was touched at Broad Clyst.

But look at the comparison between 113 and 748 on the up grades: the respective minima were 43 and 48 m.p.h. at Semley (the latter engine sustained 60 for several miles between Wilton and Dinton on gradually rising grades); 44 and 47½ at mile-post 113½ beyond Templecombe (after 2½ miles at 1 in 80–100); 51 and 52½ at mile-post 126¼, beyond Sutton Bingham; 34½ and 38 at mile-post 133, near Hewish Gates (after 2¾ miles at 1 in 80); and then 26 and 34 m.p.h.—a notable difference here—after climbing the 6¼ miles of Colyton bank, mostly at 1 in 80, to mile-post 152½. No. 748 *accelerated* to this figure after having fallen to 33 m.p.h., and further to 37½ on the mile at 1 in 132 through the summit tunnel.

More notable differences in uphill work might have been noted were it not that No. 748 was being driven under easy steam, whereas No. 113 was going pretty well "all out" for most of the distance. Even so, had No. 748 achieved No. 113's times from Honiton into Exeter, which from her previous speed exhibitions was easily possible, Exeter would have been reached in 92½ min. from Salisbury, or in 91½ min., allowing for the p.w.r. check at Hardington, near Crewkerne. With equally fast downhill work on all down grades a time of 90 min. would probably have been possible. Adding these times to the previous achievements of the same engine between Waterloo and Salisbury, we see with what perfect ease—provided that water-troughs were laid down—the Southern Railway could, with these fine engines, equal the Great Western three-hour schedule to Exeter. On this particular run I should put the equivalent net non-stop time at 177 min. for the 171·8 miles, proportioned as follows: to Basingstoke 51½ min.; Andover, 70 min.; Salisbury (pass slowly), 87 min.; Templecombe, 118 min.; Yeovil Junction, 128 min.; mile-post 133, 139 min.; mile-post 153½, 161 min.; Sidmouth Junction, 166 min.; and Exeter, 177 min. Thus 3 hours would allow a small margin for possible delays *en route*, as in addition to this 3 min. the engine had plenty of

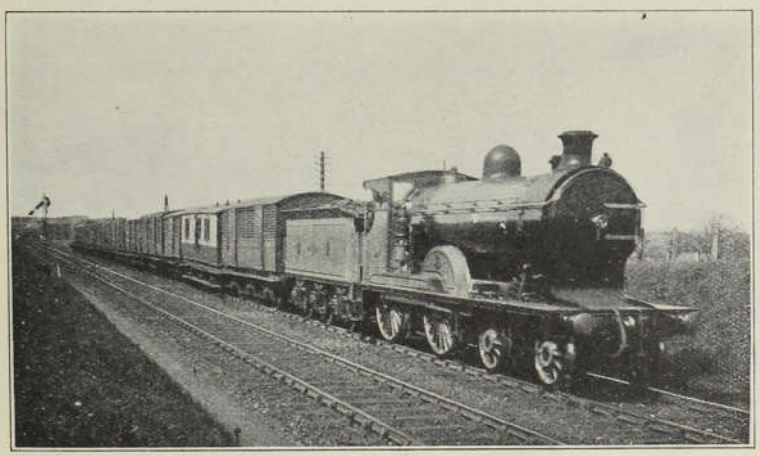

Photo.] LONDON MIDLAND AND SCOTTISH RAILWAY. [*Henry L. Salmon.*

Aberdeen and South fish train near Perth. Caledonian 4-4-0 locomotive No. 71.

power in reserve for use if required. From Sidmouth Junction we passed Exmouth Junction, 10·7 miles, in 11¾ min., having touched 80½ m.p.h. for a third time at Broad Clyst, but were prevented from achieving a smart start-to-stop time of 14 min. to Exeter, 12·2 miles, by a brief signal stop outside. This was throughout a most exhilarating journey, and bettered the best of my pre-war experiences.

The other two down runs may be dismissed briefly. Nos. 744 and 748 achieved respective maxima of 53½ and 56½ m.p.h. at Dinton, 69 and 76½ at Gillingham, 66 and 77½ at Sherborne, 69 and 72½ on the descent from Hewish to Axminster, and 68 and 74 in descending from Honiton to Broad Clyst, No. 744 being thus very severely restrained in regard to downhill speeds. Uphill, however, the differences were very small, the minima being 41½ and 43½ m.p.h. at Semley, 41½ and 40 at mile-post 113½, 45 and 43½ at mile-post 126¼, 31 and 32 at mile-post 133, and, finally, 26 and 30½ at the 152½ mile-post, which marks the top of the steepest section of Colyton bank. Actually speed fell to a shade below 30 m.p.h. on the short 1 in 70 in the latter case, but recovered to the figure mentioned, and further to 34 at mile-post 153½. After the Axminster check No. 748 accelerated to 70½ m.p.h. before commencing the ascent of Colyton bank. The latter run was on a schedule of 101 min. to Exeter, passing Templecombe in 32 min., Yeovil in 43 min., and Sidmouth Junction in 88 min., but the former train was booked from Salisbury to Exeter in 104 min.

Of the up runs, both recorded by a correspondent, the first was timed on the fastest and hardest of all the up timings—the 10.30 a.m. from Exeter—which includes a 2-min. stop at Sidmouth Junction in a booking of 104 min., and is equivalent to a non-stop run in something like 99 min., while the second was on the 12.30 p.m., allowed 102 min., with the biggest single-headed load—415 tons—that I have ever known over this road. Speeds on Whimple bank—5¾ miles at 1 in 170–100—dropped from 67 and 64½ to 33½ and 31½ m.p.h., and the 4½ miles at 1 in 100 (chiefly)-90 past Honiton resulted in minima of 29½ and 29 m.p.h. Down Colyton bank maxima of 80½ and 71½ m.p.h. were recorded, in both cases after a p.w.r. check, and No. 703, in addition, suffered adverse signals at Axminster. Up the 13-mile bank to Hewish the minima were 41 and 40½ m.p.h., up Sherborne bank 32½ and 32 m.p.h., and up the ascent to Semley 36½ and 37 m.p.h., with intervening maxima of 77½ m.p.h. in both cases on Crewkerne bank, of 79 and 75 m.p.h. at Templecombe, and of 68 and 70½ m.p.h. before the usual Wilton slack. In view of the disparity in the loads, the close correspondence of the two sets of times is very extraordinary, the maximum difference between Chard Junction and Salisbury only amounting to 25 sec. The big engine on the second of these up journeys gave ample evidence of her capabilities over such a road with a load of this magnitude, and no apologies need be made for the loss of a minute on schedule in these difficult circumstances.

I had one up run from Exeter to Salisbury in which No. 751 made an exceptionally fine start with 270 tons, touching 68 m.p.h. at Broad Clyst, and not falling below the really high minima of 41 and 39 m.p.h. on the two stages of the difficult ascent to Honiton Tunnel, so passing Exmouth Junction in 3 min. 20 sec., Broad Clyst in 7½ min., Whimple in 11 min. 40 sec., Sidmouth Junction in 16 min. 35 sec., Honiton in 22 min., and mile-post 153½ summit in 23 min. 50 sec. But speed was rigidly restrained down Colyton bank, and in addition we were badly checked for p.w. repairs at Axminster, so taking 41 min. 5 sec. to Chard Junction and 49 min. to mile-post 133 summit, which we passed at 45½ m.p.h. (after recovering from the slack to 53½ m.p.h. on the climb). After that the maxima were 77½ m.p.h. on Crewkerne bank and 75 at Yeovil Junction, and the minima 60 at mile-post 126¼ and 37½ on Sherborne bank, giving times of 58 min. 25 sec. to Yeovil Junction, 62¾ min. to Sherborne, 67 min. 35 sec. to Milborne Port, and 70 min. 55 sec., or 68 min. net, for the 59·8 miles to Templecombe, start-to-stop. This was excellent work, as the schedule for this run was 72 min. Checks, however, ruined the Templecombe-Salisbury stage.

And now, lastly, a brief word about the Southampton runs. The only run of my own is the first in the table, where No. 419, on a foggy day which badly delayed our start, ran so splendidly from Woking onwards as to pick up no less than 7 min. on schedule from there to Southampton. This was again quite a casual run, so far as I was concerned, and so far from having had any conversation with the driver, I am unfortunately unaware even of his

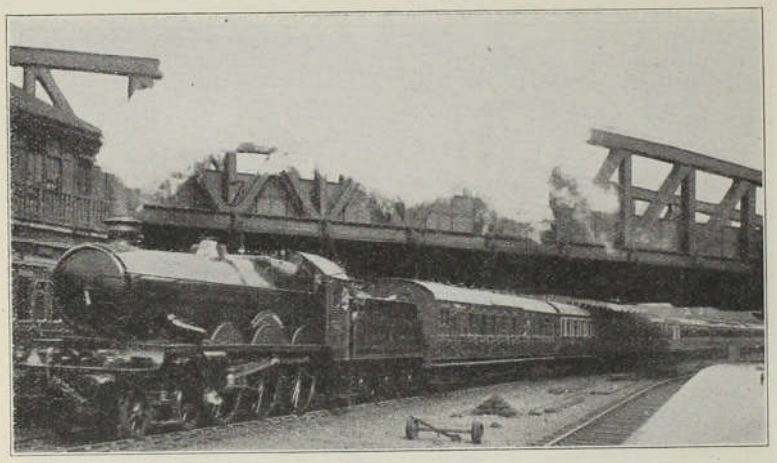

Photo. GREAT WESTERN RAILWAY. [*F. E. Mackay.*

Cheltenham express leaving Paddington.
New four-cylinder 4-6-0 locomotive, No. 4073, "Caerphilly Castle."

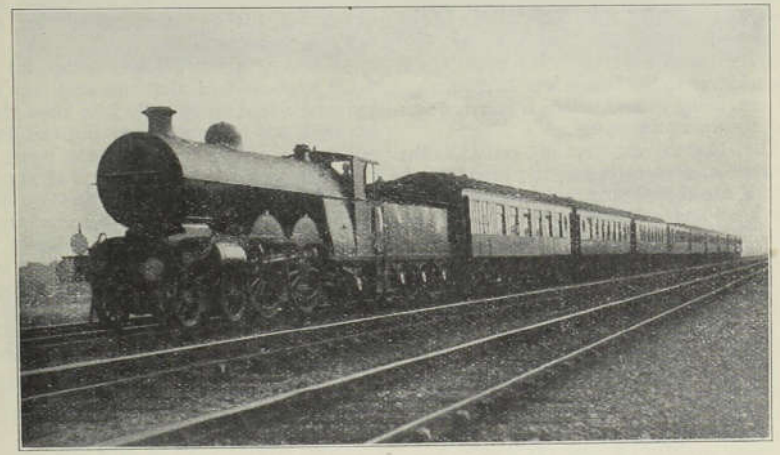

Photo. SOUTHERN RAILWAY. [*O. J. Morris.*

Up afternoon "Southern Belle" (nine cars) near Salfords.
Brighton 4-4-2 locomotive No. 423.

name. The load consisted of nine bogies, five of the new wide stock, weighing 300 tons in all, and so was quite substantial. After the Byfleet check, which was severe and prolonged, we recovered to 46½ m.p.h. at Woking, and sustained 49 all the way from Brookwood to mile-post 31. Speed then varied between 64½ and 57½ m.p.h. nearly to Basingstoke, and the minimum beyond Battledown was exactly 50—a fine figure after 4½ miles up at 1 in 249. By Litchfield Tunnel we were doing 57½, and then followed a most bracing "flight" to Southampton, passing Micheldever at 69 m.p.h., Waller's Ash at 75, maintaining 77½ to 79 all the way from Winchester to Allbrook Junction, easing to 71½ through Eastleigh, and to 66 at St. Denys, where we slowed carefully for Northam Junction. Average speed over the 19·1 miles from Micheldever to St. Denys was 73·2 m.p.h., 5½ min. being gained between Basingstoke and Southampton alone.

The second run is of considerable interest as demonstrating the capacity of one of the recent superheater rebuilds of the small-boilered Drummond 4-4-0 class, No. 300 having to tackle the heavy 12-coach load of 385 tons, half of which was of the new wide stock. Maximum speeds were 57½ m.p.h. at Surbiton, 58 at Byfleet, 60 at Farnborough, and 69½ at Eastleigh, while the minima were 47½ at mile-post 31 and 42 beyond Battledown, and time would have been more than easily maintained but for the concluding signal check. The powerful combination of engines in the next column made light of their 400-ton train, although they did not, save in starting out to Surbiton, better the unaided work of No. 748 on my best Salisbury journey. Speeds were 64½ m.p.h. at Byfleet, 47½ at mile-post 31, 65 at Fleet, 63 at Hook, 66½ before Basingstoke, 45 beyond Battledown, and 75 was just reached on the descent past Winchester. Actually the run was made in 86 min., or 6 min. less than schedule; net time was about 84¾ min. It will be remembered that the pre-war allowance of the Bournemouth two-hour trains was 87½ min. to passing Southampton West, which these two engines and also No. 419 bettered substantially.

Then follow the efforts with tremendous trains of Nos. 472 and 471, of the largest Drummond 4-4-0 type now superheated. No. 472 touched 58 m.p.h. at Surbiton and 55½ at Byfleet, and No. 471, after the initial delays, attained 57 and 59 m.p.h.; thereafter the speeds were 40½ and 45 m.p.h. at mile-post 31, 55½ and 59½ before Basingstoke, 41 and 40½ after Battledown, and 68 and 74 in descending to Eastleigh. After allowing for delays, No. 472 lost the slight margin of 1¾ min. on schedule; but by the very fine work Driver Penton got out of No. 471 with this huge train, his net gain was 2 min.

An even more colossal load—for a 4-4-0 engine—was that brought up by Driver Bullard on No. 470; he knew that his work was being recorded, but this does not in any way detract from the merit of the work performed. A speed of 48 m.p.h. was attained at Eastleigh, and up the 16½ miles at 1 in 250 from there to Litchfield Tunnel speed fell very gradually to a minimum of 39½ from Micheldever onwards. From 60 m.p.h. at Battledown speed increased to 72½ below Basingstoke, and then ranged between 64½ and 57½ from there onwards to mile-post 31; after that 69 was reached at Byfleet Junction, and between 63½ and 59 was kept up until beyond Surbiton. It was creditable indeed in such circumstances to lose no more than 3 min. net from Southampton to Waterloo. Here I must conclude these notes.

It has been to me very pleasant to renew acquaintance with the old-time brilliance of South Western running, and if only the terminal working could be improved on the up journeys, as well as the working at certain intermediate stations—more particularly Salisbury and Exeter—South Western overall times might challenge comparison with the best of those achieved elsewhere in the country.