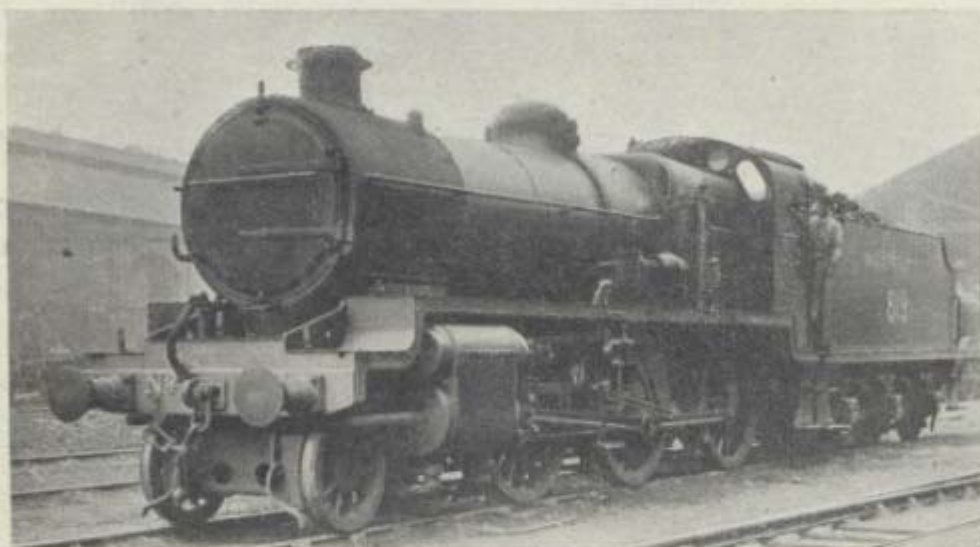


The Maunsell Moguls, S.R.—I

By W. J. REYNOLDS



Photo]

[W. J. Reynolds

2-6-0 No. A819 as fitted with a Worthington feed pump

UNTIL the year 1914 the late South Eastern & Chatham Railway, although provided with locomotives which did their work with reasonable efficiency, and many of which were certainly handsome machines, had taken few if any steps towards the development of front-end design on the lines which have since been so widely applied in this country. In 1914, however, Mr. R. E. L. Maunsell became Chief Mechanical Engineer at Ashford, and he immediately set about the preparation of designs for two thoroughly up-to-date types—a 2-6-0 tender engine for general service, and a 2-6-4 tank for short distance express passenger work. Because of the interruption caused by the war of 1914-1919, however, it was not until late in 1917 that the two prototypes appeared on the road. The chief difference between them was that the tender engine had 5 ft. 6 in. driving wheels, and the tank 6 ft., but in all other particulars of motion and boiler the two types were identical, and as both had a working pressure of 200 lb. per sq. in., the smaller driving wheels of the Mogul gave it the larger tractive effort, at 85 per cent. boiler pressure, of 26,040 lb., as compared with the lower 23,865 lb. of the tank. Both engines had leading pony truck and trailing bogie wheels, 3 ft. 1 in. dia., and 19 in. × 28 in. cylinders with 10 in. dia. inside admission piston-valves.

A novelty in S.E. & C.R. practice was the

coned boiler, tapering in diameter from 4 ft. 8 in. to 5 ft. 3 in., and with steam collected in a perforated pipe arranged across the top front corner of the Belpaire firebox, both as in G.W.R. practice; a dome was fitted, but only to house the top-feed, and the regulator was in the smokebox. The boiler had a heating surface of 1,526 sq. ft., to which the firebox contributed 135 sq. ft., and the 21-element superheater added 285 sq. ft.—a combined total of 1,811 sq. ft. Grate area was 25 sq. ft. Steam distribution was by means of the Walschaerts valve-motion, and G.W.R. influence was again discernible in the length of valve-travel, which was no less than 6 7/16 in., due to a steam lap of 1 1/4 in. In fact, Mr. Maunsell was the first to follow G.W.R. practice in adopting long travel, and no doubt he was influenced in this and other directions by having drawn upon Swindon when enlarging his technical staff at Ashford. The single slide-bar crosshead was an unusual feature for engines of such size and power. There had been no previous use on the S.E. & C.R. of a leading Bissel truck; the slides of this were of the Cartazzi type, in which lateral displacement is controlled by inclined planes working in an oil-bath. The 2-6-0, numbered 810, weighed 59 1/2 tons, of which 51 tons was adhesion weight; the 2-6-4, which carried the number 790, weighed 82 1/2 tons, with 52 1/2 tons of adhesion. For more than two



[Photo]

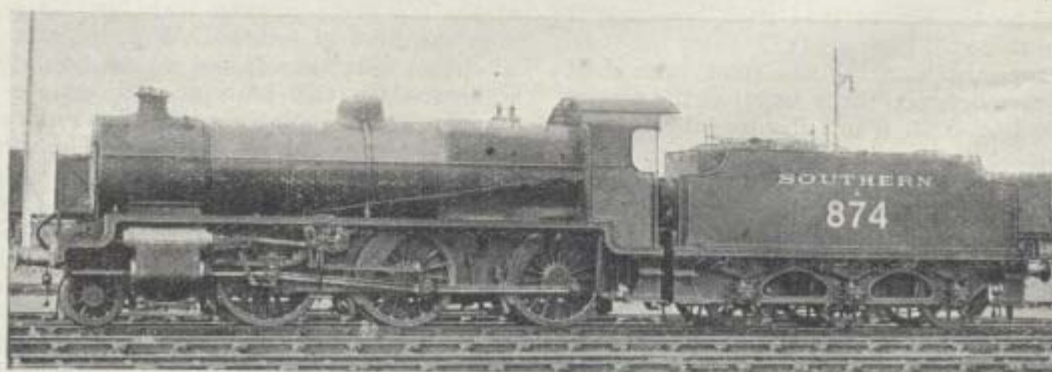
Southern Railway 3-cylinder "N1" class 2-6-0 No. 822 [W. J. Reynolds]

This was the prototype of the 3-cylinder type of 1922 and was fitted with the derived valve gear for the inside cylinder

years these engines were being thoroughly tried out before any more were put in hand.

It was therefore 1920 when the next 2-6-0s appeared, numbered from 811 to 815, and in 1922 another ten were begun, Nos. 816 to 825, the last of which came out in 1924. Nos. 823 to 825, which went into service just after the grouping, were the last to carry the S.E. & C.R. date plates, and were at first painted grey. No more 2-6-4 tanks appeared until after the formation of the Southern Railway, and the introduction of letter prefixes to indicate the section to which the engine belonged; when the next 2-6-4 emerged from Ashford in 1925, it was as No. A791. Of the 811-825 series of Moguls No. 822, dated 1923, was provided with three cylinders 16 in. dia. \times 28 in. stroke, and 8 in. piston-valves, and the working pressure was reduced to 190 lb., to bring the tractive effort down to 26,310 lb., and so make it as nearly as possible equal to that of the 2-cylinder engines for trial purposes. At a later date the 200 lb. pressure was restored. Two sets of valve-motion only

were fitted, the arrangement for working the inside valve being devised and patented in 1909 by Mr. H. Holcroft, Technical Assistant to Mr. Maunsell. Instead of the valve spindles being extended forward, and coupled direct to the rocking levers, as in the late Gresley patent, the motion was taken from two rods which connected to the outside valve-motions and passed outside the cylinder casings, being coupled to the rocking levers in front. These rods were attached to rocking shafts behind the cylinders, to which the spindles were also attached, as may be seen in the photograph of No. 822. This particular arrangement permitted of examination without having to take down any of the gear, and it avoided the disturbance to valve-setting that can be caused by expansion by heat of the spindles, as in the Gresley motion, but it had a defect which eventually led to it being abandoned in favour of three independent sets of valve gear, the outside connecting rods had a tendency to whip with consequent uneven steam

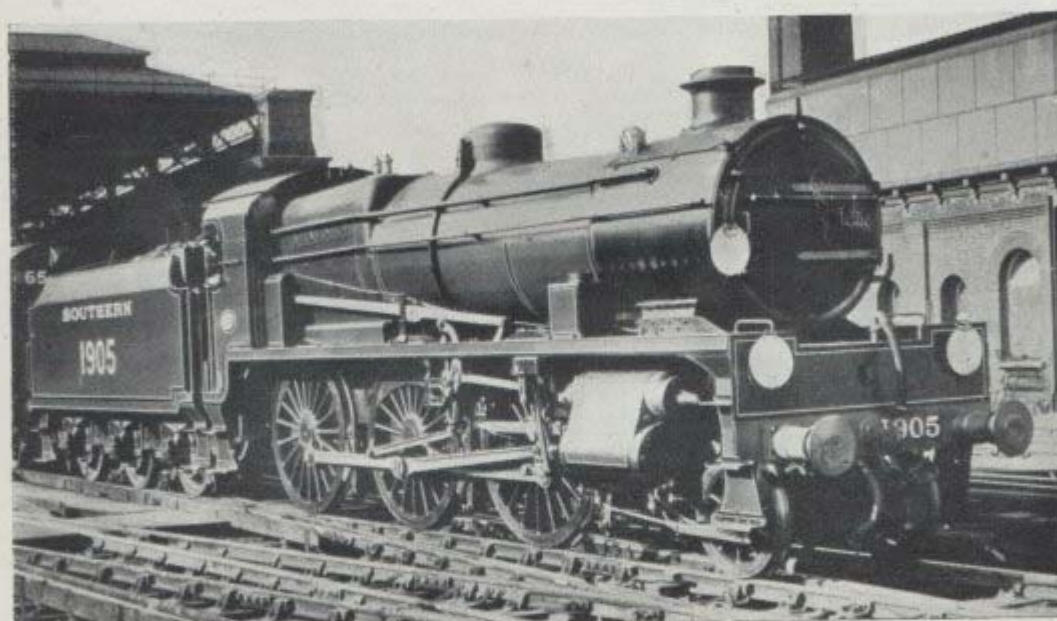


[Photo]

Southern Railway 2-cylinder "N" class 2-6-0 No. 874, one of the "Woolworths" [W. J. Reynolds]

distribution. The altered cylinder disposition increased the engine weight by $3\frac{1}{4}$ to $62\frac{1}{4}$ tons, and the adhesion weight to 53 tons. The 3-cylinder design was adopted experimentally in the first place, but it also enabled the engines to work over the Tonbridge-Hastings line, on parts of which the clearances are not wide enough to take the 2-cylinder type. Among experimental modifications, Nos. 812 and 818 ran for a time with cylindrical stovepipe chimneys and G.W.R. jumper-top blast-pipe, in connection with certain smokebox experiments, as a result of which the present large-diameter cast-iron chimney eventually became standardised. No. 819 was fitted with a Weir feed-

Railway eventually purchased these fifty, in various stages of completion. No. A866 was on show at the Wembley Exhibition in 1924. The fertile inventiveness of the railwayman as to nicknames soon fastened on the class the name of "Woolworths." Five more three-cylinder Moguls, Nos. A876 to A880, were built at Ashford in 1930, but differed from No. A822 in having three independent sets of valve-motion instead of the derived gear; also the working pressure was increased from 190 to 200 lb., and a 4,000-gal. tender, somewhat similar to that of the "Schools" class 4-4-0s, was provided. The Southern Railway about this time adopted its standard locomotive numberings;



Photo]

[W. J. Reynolds

Southern Railway 3-cylinder "U1" class 2-6-0 No. 1905 at London Bridge when working the Eastbourne services

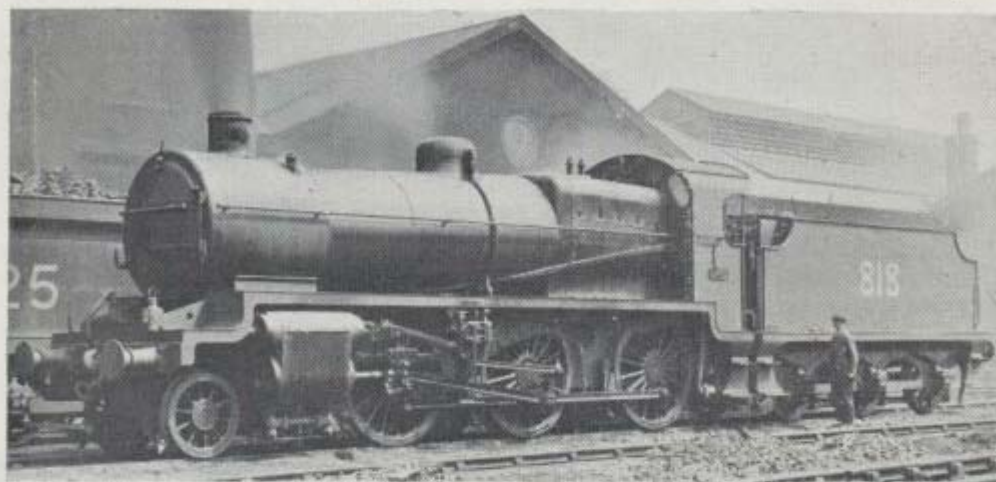
water heater and feed pump. No. 816 was equipped with an apparatus for heat conservation, which returned the whole of the exhaust steam as hot feed-water and so required the installation of a fan in the smokebox to induce draught in the firebox. All these locomotives were later altered to conform to the standard design.

The next Moguls were a series of fifty, Nos. A826 to A875, which were added to the stock in 1924 and 1925 due to the decision reached after the 1914-1919 war to build a series of locomotives at Woolwich Arsenal as a relief to unemployment. The Maunsell 2-6-0 design was chosen, and 100 engines were put in hand, of which the Southern

as a result all the 2-cylinder 2-6-0s, Class "N," had their numbers altered to 1810 to 1821 and 1823 to 1875 inclusive, and the 3-cylinder engines, Class "N1" received the numbers 1822 and 1876 to 1880. No. 1850 was fitted for a time with the Dendy-Marshall valve-gear, but this was not a success, and was later removed. The last of the "N" class 2-6-0s to be built, in the years 1932 to 1934, were Nos. 1400 to 1414 inclusive; Nos. 1407 to 1414 were fitted for left-hand drive, which later became standard practice. This brought the 5 ft. 6 in. Maunsell 2-6-0s up to a total of 86, 80 of the 2-cylinder and 6 of the 3-cylinder type.

(To be continued)

The Maunsell Moguls of the Southern Railway



[Photo]

[W. J. Reynolds]

Southern Railway 2-6-0 No. 818

Shown with experimental chimney in connection with blast-pipe experiments

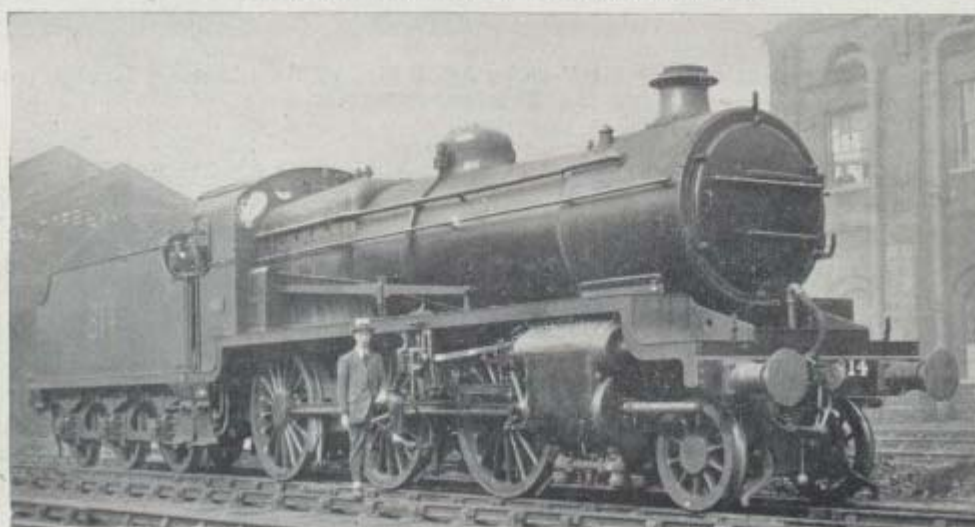


[Photo]

[F. M. Gates]

2-cylinder "N" class 2-6-0 No. 1413

Fitted with left-hand drive, standard large diameter chimney, and "Schools" class tender and deflector plates on side of smokebox



[Photo]

[W. J. Reynolds]

2-cylinder "N" class 2-6-0 No. 814, built in 1920

Shown in her original S.E.C.R. colours

The Maunsell Moguls, S.R.—II

By W. J. REYNOLDS



[Photo]

[W. J. Reynolds]

Southern Railway 2-6-4T 3-cylinder class "K1" No. A890, *River Frome*, with derived valve gear for inside cylinder

WE now come to the 2-6-4 tanks. As previously mentioned, No. A790 was the only engine of this type until building was resumed in 1924, when ten more were put in hand. They were begun at Ashford works but were completed by Armstrong-Whitworth. As with the first series of Moguls, it was decided to build one of the tanks with three cylinders, and this received the number A890; the other nine were numbered A791 to A799 inclusive. No. A890 was generally uniform with 3-cylinder 2-6-0 No. A822, except, of course, for having 6 ft. driving wheels, like the remainder of the 2-6-4 tanks; also the pressure was 200 lb. The maximum valve-travel was restricted to $5\frac{1}{2}$ in., on account of the maximum cut-off being limited to about 66 per cent. These alterations put the weight in working order up from $82\frac{1}{2}$ to $88\frac{1}{2}$ tons, and increased the adhesion weight from $52\frac{1}{2}$ to $56\frac{1}{2}$ tons. The ten 2-cylinder 2-6-4s, Nos. 790 to 799, were sent to Brighton, and fitted with the Westinghouse brake; the compressors were on the right-hand side of the smokebox, as may be seen in the photograph of No. A799. Except that their tank capacity was at times hardly adequate, these engines gave an admirable account of themselves on the fast Brighton and Eastbourne services, as the

records given later in this article bear witness. In 1925 a second series of 2-cylinder tanks was put in hand at Brighton works, and was numbered A800 to A809, bringing the total to 20 of the 2-cylinder variety and the one 3-cylinder engine. They were formed into class "K" and all received names after rivers in the southern counties, as follow:—

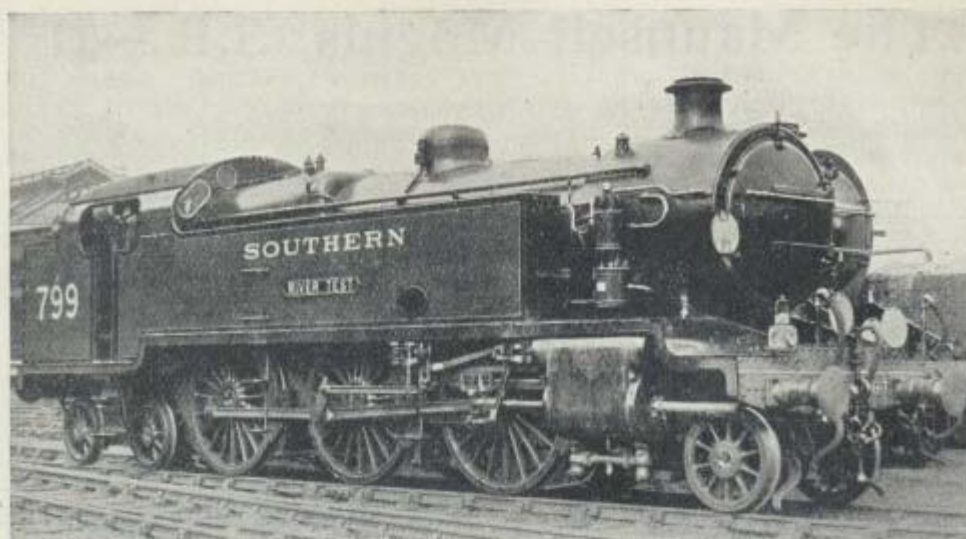
2-cylinder series

A790 <i>River Avon</i>	A800 <i>River Cray</i>
A791 <i>River Adur</i>	A801 <i>River Darent</i>
A792 <i>River Arun</i>	A802 <i>River Cuckmere</i>
A793 <i>River Ouse</i>	A803 <i>River Itchen</i>
A794 <i>River Rother</i>	A804 <i>River Tamar</i>
A795 <i>River Medway</i>	A805 <i>River Camel</i>
A796 <i>River Stour</i>	A806 <i>River Torridge</i>
A797 <i>River Mole</i>	A807 <i>River Axe</i>
A798 <i>River Wey</i>	A808 <i>River Chur</i>
A799 <i>River Test</i>	A809 <i>River Dart</i>

3-cylinder engine A890 *River Frome*

A singular omission from this list was the biggest of all the rivers in or bordering on Southern territory, the Thames.

On August 24, 1927, a serious accident befell No. A800, *River Cray*, which affected the destiny of the entire class. This engine was working the 5 p.m. express from Cannon Street to Dover, which had—and continued to have until the present war—a non-stop timing to Ashford practically



[Photo]

[W. J. Reynolds]

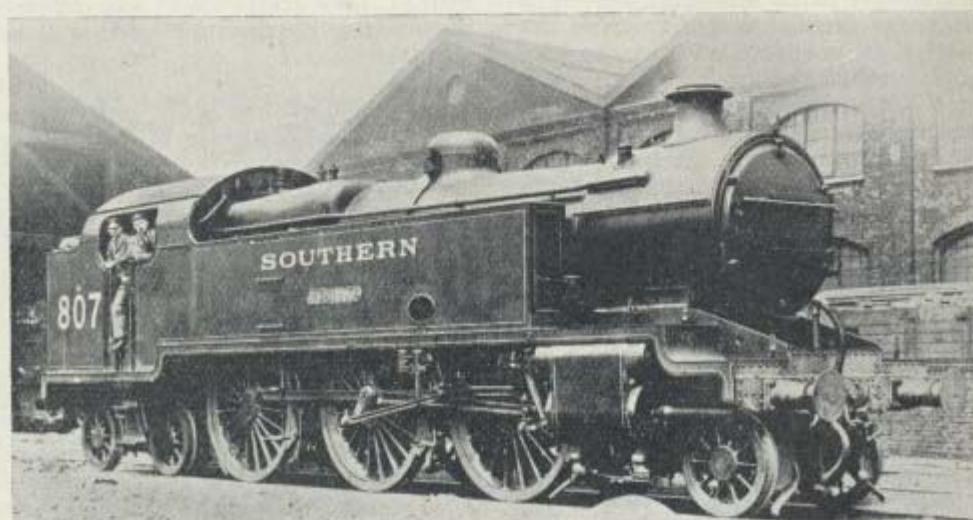
Southern Railway 2-6-4T 2-cylinder class "K" No. A799, *River Test*, fitted with Westinghouse compressor

equalling that of the 80 min. Charing Cross-Folkestone trains, and was hauling a 247-ton train of seven 8-wheelers and the Pullman car, *Carmen*. The express had just passed Dunton Green at the usual high speed when the engine began to roll severely and the leading coupled wheels became derailed. The engine continued thus for about $\frac{1}{2}$ mile when it became completely derailed at some catch points. The damage to rolling stock was greatly increased by the existence of an overbridge just beyond the point of derailment with a pier interposed between the up and down roads, against

which certain of the coaches crashed; 13 passengers lost their lives.

It was revealed in the Ministry of Transport enquiry that there were considerable irregularities in the track. The alignment of the curve was not true, nor was the superelevation consistent. However, after the accident the "River" class engines were taken out of service pending the Ministry of Transport enquiry, as some similar derailments had occurred to engines of the class previously, but not serious enough to cause alarm.

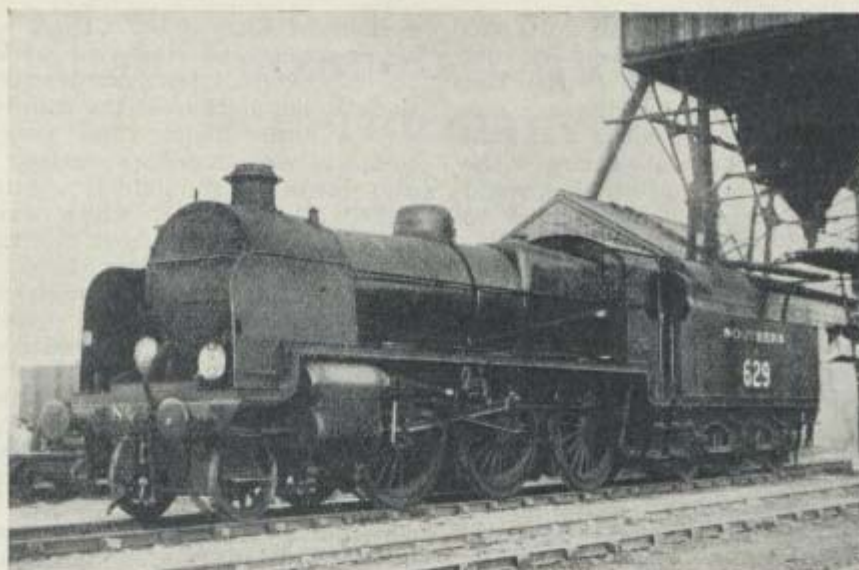
Tests of these engines were subsequently



[Photo]

[W. J. Reynolds]

Southern Railway 2-6-4T 2-cylinder class "K" No. A807, *River Axe*, second series, built at Brighton



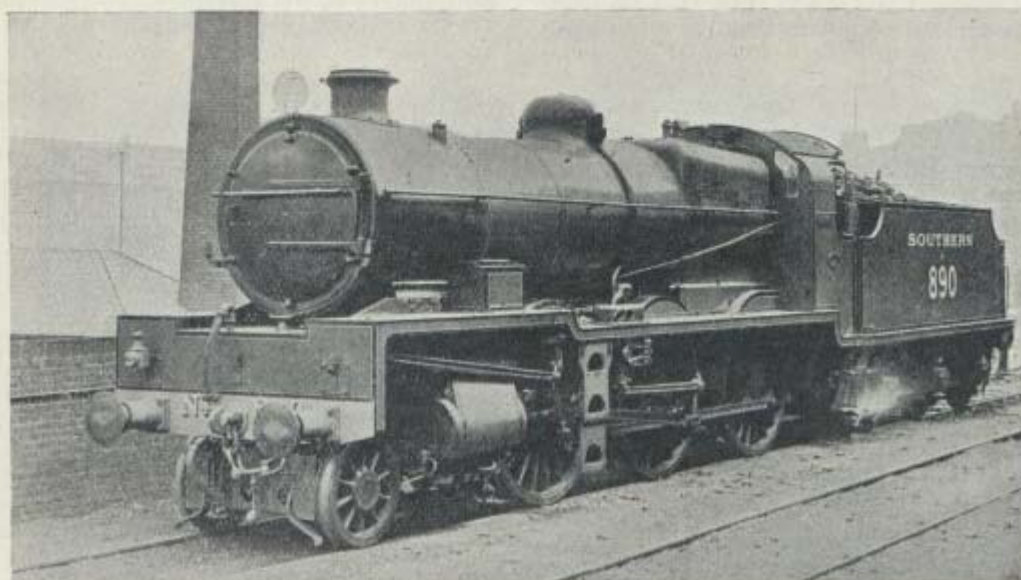
Photo]

[Dr. P. Ransome Wallis

Southern Railway 2-cylinder 2-6-0 class "U," fitted for burning pulverised fuel, No. A629

carried out on the L.N.E.R. in which No. 803, *River Itchen*, the 3-cylinder tank No. 890, *River Frome*, and the "King Arthur" 4-6-0, No. 782, *Sir Brian*, were all concerned. These tests took place on the L.N.E.R. main line round the curves in the neighbourhood of Offord, near Huntingdon. The line had been fettled beforehand, to assure its correctness of alignment and level, and the 2-6-4 tank engines were run

light, with their side tanks full, half-full, and nearly empty, alternately with the pony truck and the bogie leading; speeds of from 80 to 86 m.p.h. were attained. Similar tests were made on the Southern Railway main line near Woking. On the L.N.E.R. the riding of the tank engines gave no cause for apprehension, even at the highest speeds; the riding on curves was slightly steadier with the bogie leading than with the pony



Photo]

[W. J. Reynolds

Southern Railway 2-6-0 3-cylinder class "U," No. A890, converted from 2-6-4T, but still retaining the derived valve gear for the inside cylinder

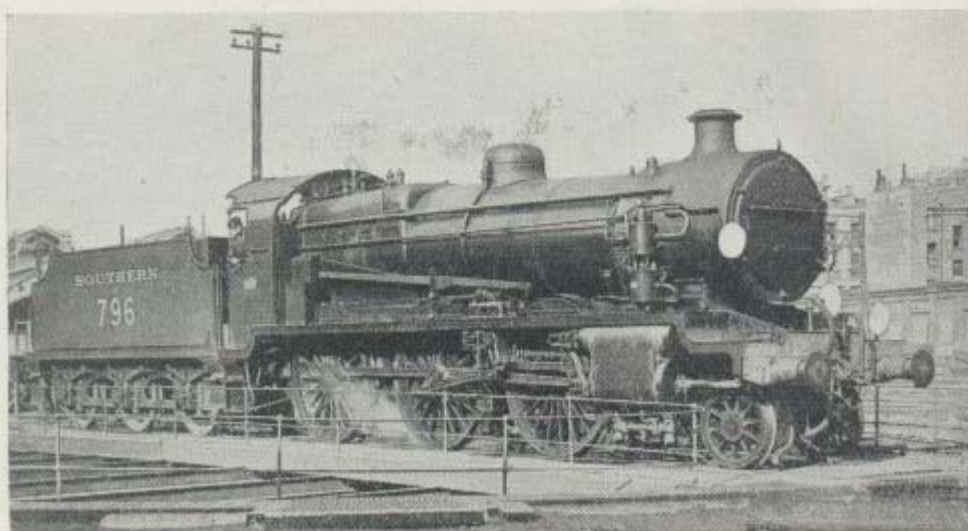
truck leading, and the 3-cylinder 2-6-4 was found to be rather more lively on her springing than her 2-cylinder sister. But on the Southern line the performance was not so good, and led to the ruling that until the alignment, drainage, and packing of the track in general had been improved, it would be unsafe to allow these locomotives to travel at over 70 m.p.h.

The large number of casualties brought the accident under considerable public notice, and the daily press spread itself over the subject at great length, making up by the vigour of its denunciations for any lack of knowledge on the subject. One brilliant and ingenious scribe, doubtless with the Mississippi in his mind, claimed that if the engines were named after rivers, they must, of course, be prone to roll off the track! Although the engines were officially exonerated, the Southern Railway decided to rebuild them all as tender engines of the 2-6-0 type. To the regret of the Southern Railway enthusiasts, all the names were jettisoned when the engines were rebuilt. Conversion was not a difficult matter, because of the general uniformity of the 2-6-4 tank and 2-6-0 tender types, and was completed during 1928. The 2-cylinder engines, which differed from the "N" class engines, of course, by having 6 ft. in place of 5 ft. 6 in. driving wheels, became Class "U" and were later renumbered 1790 to 1809 inclusive, and the 6 ft. 3-cylinder 2-6-0 became No. 1890, and was classed "U1."

The value of the larger driving wheels for fast passenger work was such that in 1928 it was decided to put in hand 30 additional

engines of Class "U." There was close adherence to the converted tank design; the only external difference of note was that the running-plate over the coupled wheels was a little higher, and very shallow splashers were therefore needed; the cab also was of the standard type fitted to the "N" class Moguls, which has certain differences of outline from that carried by the conversions. As compared with the 59½ tons of the "N" class engines, the "U" class weigh 62½ tons in running trim, including 53½ tons adhesion weight. Of this series, Nos. A610 to A619 were built at Brighton in 1928 and Nos. A620 to A639 at Ashford in 1928 and 1929. Nos. A631 to A639 were fitted with chimneys having *capuchons* and large tenders similar to those fitted to the "Schools." These last were allocated to the Eastern and Central Sections, and in the closing steam days of the Brighton main line were often employed on the 60-min. Victoria-Brighton trains, including, at times, the Southern Belle. In the general renumbering this series became Nos. 1610 to 1639 inclusive. No. 1629 was the subject of many experiments with pulverised fuel, and was the earliest of the class to be fitted with deflector plates along the sides of the smokebox, in an endeavour to lift the exhaust and smoke when the engine was running. The pulverising plant was erected at Eastbourne, where No. 1629 was stationed. After prolonged trials, successful results were achieved, but the saving in fuel was not sufficient to justify continuance of the system.

(To be continued)



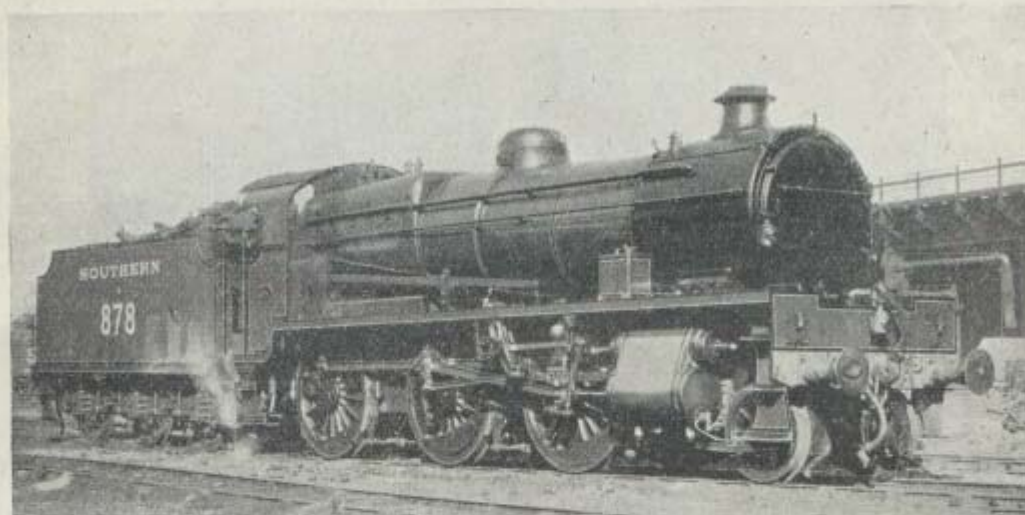
[Photo]

Southern Railway class "U" 2-6-0 locomotive No. A796, converted from 2-6-4 tank, River Stour

[W. J. Reynolds]

The Maunsell Moguls, S.R.—III

By W. J. REYNOLDS



Photo]

[W. J. Reynolds

Southern Railway 3-cylinder class "N1" 2-6-0 No. 878, with 3 independent sets of valve-gear and 4,000 gal. tender

IN 1930 increased locomotive power was needed for the Eastbourne traffic, as well as for the Portsmouth direct line, and in order to permit of an increase of adhesion weight without imposing additional strains on the track, and to increase lateral clearances (so that the engines might also work to Hastings *via* Tunbridge Wells) by the use of outside cylinders of smaller diameter, it was decided to add to Class "U1"—the solitary tank conversion of the 3-cylinder type—by building twenty 3-cylinder 6 ft. 2-6-0s. They came out in 1931 as Nos. 1891 to 1910. The only difference of note from No. 1890 was that three sets of valve-gear were provided in place of the derived motion, and the higher running-plate over

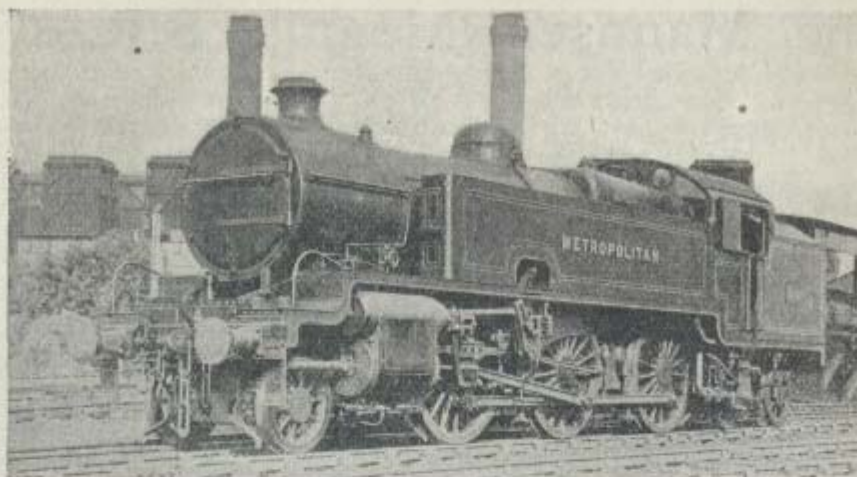
the coupled wheels, similarly to Nos. 1610 to 1639. The "U1" series weigh 65½ tons in running order, with 54½ tons adhesion weight. This has brought the total of the "U1" class to 21 engines, and the "U" class numbers 50 engines; the "N," "N1," "U," and "U1" locomotives together make an aggregate of 157 Maunsell Moguls, 130 of the 2-cylinder, and 27 of the 3-cylinder arrangement. The enginemmen generally prefer the 2-cylinder engines from the performance point of view.

This history has certain sequels, which must be briefly reviewed. Of the 100 Maunsell 2-6-0s put in hand at Woolwich after the last war, 6 sets of parts were disposed of in 1925 to the Midland Great Western Railway of Ireland, and, at a later date, 20 sets to the then Great Southern & Western Railway, and from the time of the Irish grouping the Great Southern Railways have therefore owned 26 of these engines; the original six, with 6 ft. driving wheels, are numbered 393 to 398 in the present G.S.R. list, and are classed as "K1A," and the other twenty are Nos. 372 to 391, Class "K1," with 5 ft. 6 in. driving wheels. The parts had to be adapted to run on the 5 ft. 3 in. Irish gauge, and in order to make the engines suitable for running over light tracks the weight was reduced by various expedients to 61 tons, and the adhesion weight to 48

Class	Type	Driving Wheel Dia.	Numbers	Date of Building
N (80)	2-cyl.	5 ft. 6 in.	1400—1414	1932—1934
			1810	1917
			1811—1821	1920—1924
			1823—1825	
			*1826—1875	1924—1925
N1 (6)	3-cyl.	5 ft. 6 in.	1822	1923
U (50)	2-cyl.	6 ft. 0 in.	1876—1880	1930
			1610—1639	1928—1931
			+1790	1917
			+1791—1809	1925—1926
U1 (21)	3-cyl.	6 ft. 0 in.	+1890	1925
			1891—1910	1931

* Woolwich Arsenal locomotives

† Converted in 1928 from 2-6-4 tanks to 2-6-0 tender engines



Photo]

[W. J. Reynolds

Metropolitan 2-6-4 tank locomotive rebuilt from 2-6-0 tender engine in 1925; the class of six locomotives was taken over by the L.N.E.R. in November, 1937 and is now running as 6158-6163, classified "L2"

tons. Cylinders, motion, and boilers are identical with those of the Southern "N" class, and the resemblance externally is unmistakable; the only slight alteration is in the shape of the chimney.

But perhaps the most remarkable derivatives of the Maunsell 2-6-0 are the six 2-6-4 tanks that were built by Armstrong Whitworth & Co., Ltd., for the late Metropolitan Railway in 1925 out of the same reservoir of Woolwich parts. For whereas the Southern 2-6-4 tanks were converted to 2-6-0 tender engines, here the reverse operation was undertaken of converting 2-6-0 tender engines to 2-6-4 tanks. The Metropolitan tanks differed, of course, from

the Southern 2-6-4 tanks by having the 5 ft. 6 in. dia. of driving wheel and also the Mogul driving-wheel base (7 ft. 3 in. leading to driving and 8 ft. 3 in. driving to trailing), but again the boiler and motion were identical with that of the Southern design. The Metropolitan 2-6-4 tanks, which carried that company's numbers 111 to 116, are now incorporated in the L.N.E.R. stock as Nos. 6158 to 6163 and are classified "L2." They weigh 87½ tons in running trim, of which 54½ tons is adhesion weight.

Finally mention must be made of the reversion by the Southern Railway to 2-6-4 tank construction in 1931, only three years after the conversion of the ill-fated Class



Photo]

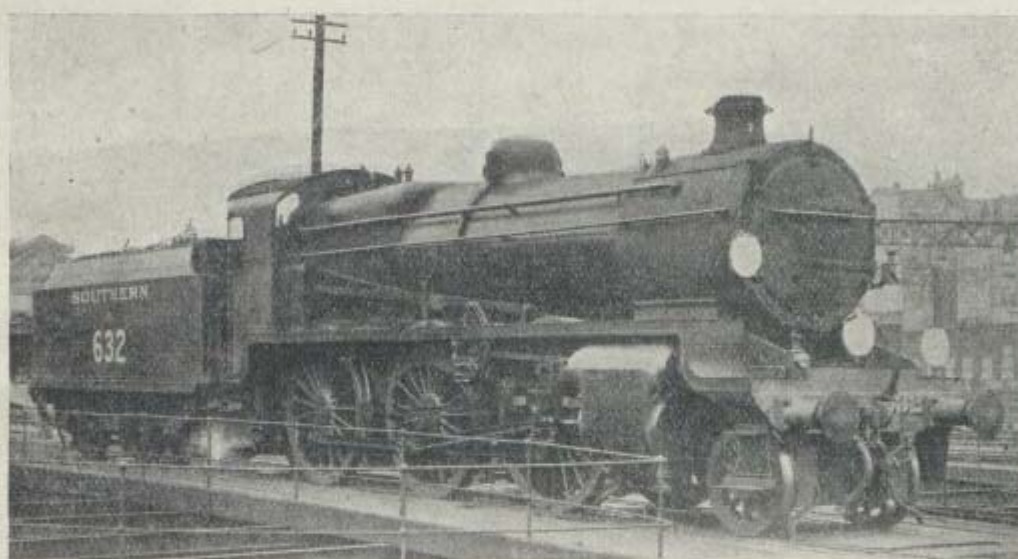
[W. J. Reynolds

Southern Railway 3-cylinder "W" class 2-6-4 tank No. 1913, with 5 ft. 6 in. driving wheels

"K." The new class, "W," was intended for freight service, so that 5 ft. 6 in. was chosen as the driving-wheel diameter, in conjunction with three-cylinder propulsion, and 16½ in. dia. cylinders in place of the 16 in. used in the "N1" and "U1" classes. The larger cylinders in conjunction with the smaller driving-wheel diameter give the "W" class tanks a tractive effort, at 85 per cent. working pressure, of 29,450 lb. But the standard Mogul boiler, with 200 lb. pressure, is used. Certain discarded parts of the "Rivers," such as the tanks, bunkers, and trailing bogies, were incorporated in these engines, and special fittings included graduated steam brakes on the bogie as well as the coupled wheels, in addition to vacuum

6 on the London & North Eastern Railway, and that all the engines concerned also incorporate various almost identical features in their cylinders and motion.

A brief note as to the performances of the locomotives to which reference has been made will fittingly conclude this article; they are drawn from past instalments of "British Locomotive Practice and Performance." The first run tabulated, behind 2-6-4 tank No. A799, *River Test*, was on the then 3.15 p.m. from Victoria to Eastbourne. After a leisurely start, there were two signal checks between Selhurst and Coulsdon, probably from the 3.10 p.m. Southern Belle ahead, and the driver therefore took things easily up to Quarry tunnel. But from there



[Photo]

[W. J. Reynolds]

Southern Railway 2-cylinder "U" class 2-6-0 No. 632, with large type tender similar to those fitted to "Schools" class locomotives

brake equipment. At first five engines of Class "W" were built—Nos. 1911 to 1915—and ten more have since been added, Nos. 1916 to 1922 in 1935 and Nos. 1923 to 1925 in 1936. They may often be seen at Old Oak, Cricklewood, and Willesden on through workings to and from the G.W.R. and L.M.S.R. lines. These engines have been an outstanding success, having made possible a reduction of one-third in the number of engines operating the services on which they are engaged, while they are capable of keeping pace with the fastest electric services over the routes concerned. It is interesting that the one type of Maunsell boiler, originated in 1917, and of remarkable efficiency, is now carried by 204 locomotives, 172 on the Southern Railway, 26 on the Great Southern Railways of Ireland, and

onwards the engine, with its 6 ft. driving wheels, showed a good turn of speed, touching 75 m.p.h. at Horley and 74 at Hayward's Heath, though speed fell off rapidly up the 1 in 264 from Horley to Balcombe tunnel. The checks out to Coulsdon cost about 3 min., and that at Wivelsfield 1 min., leaving a net time of 61½ min. to Lewes, or 3½ min. less than schedule. On another run, not tabulated, with the Southern Belle and a load of 280 tons, No. A792, *River Arun*, passed Clapham Junction in 5 min. 35 sec., East Croydon in 15 min. 53 sec., Coulsdon North in 21 min. 20 sec., Quarry in 26 min. 20 sec., Earlswood in 29 min. 20 sec., Horley in 33 min. 12 sec., and Balcombe Tunnel box in 39 min. 1 sec., after which came a permanent way check at Balcombe. Hayward's

Heath was cleared in 46 min. 25 sec., Keymer in 49 min. 10 sec., and Preston Park in 58 min. 8 sec., Brighton being reached in 60 min. 49 sec., or 58½ min. net. Speed fell from 50 to 48 m.p.h. up the 1 in 264 from Croydon to Coulsdon, had not exceeded 62 by Earlswood, but touched 73 at Horley,

nothing lower than 56 up to Quarry tunnel; East Croydon would have been reached in 45 min. (1 min. less than schedule) but for a signal check. No. 1632 had a substantial load of 340 tons, on one of the 60-min. trains, and gave a run of more even quality; speeds were 45 m.p.h. on entering Clayton

SOUTHERN RAILWAY: VICTORIA—LEWES

Engine 2-6-4 tank No. A799, River Test

Load: 41 axles, 236 tons tare, 250 tons gross

Distance		Schd.	Actual	Speeds
miles		min.	min. sec.	m.p.h.
0.0	VICTORIA ...	0	0 00	—
2.7	CLAPHAM JUNC. ...	—	6 50	—
4.9	Balham Junction ...	9	9 55	37½
6.6	Streatham Common ...	—	12 20	52½
9.4	Selhurst ...	—	15 55	46
			signs.	30
10.5	EAST CROYDON ...	17	18 00	—
13.5	Purley ...	—	23 00	41
			signs.	30
15.0	Coulsdon North ...	23	25 50	41½
17.0	Star Lane ...	—	28 55	†42½
18.8	Quarry ...	—	31 15	70½
21.9	Earlswood ...	32	34 15	75
26.0	Horley ...	—	37 40	58
29.5	THREE BRIDGES ...	40	41 05	51
31.9	Balcombe Tunnel ...	—	43 45	65
34.1	Balcombe ...	—	46 00	74
38.0	HAYWARDS H'TH ...	49	49 25	30
				*30
41.4	KEYMER JUNC.* ...	53	52 55	55½
44.8	Plumpton ...	—	58 50	52½
47.6	Cooksbridge ...	—	61 55	60
50.2	LEWES ...	65	65 35	—

* Service slack, severe † On entering Quarry Tunnel

was sustained at 54 up the 1 in 264 to Balcombe Tunnel—a good effort—and reached 68 at Hayward's Heath after the Balcombe check.

Of the two up Mogul runs tabulated, the first was with one of the converted 2-6-4 tanks, No. 1799, and the second with a 2-cylinder 2-6-0, No. 1632, both of Class "U." With 235 tons, the driver of the former took matters at first somewhat sluggishly, not accelerating above 43 m.p.h. on the 1 in 264 to Clayton tunnel, nor exceeding 64 at Keymer, while speed fell to 44 m.p.h. on the climb to Balcombe. But a tremendous spurt was then made, with a maximum of 75 m.p.h. at Horley, and

SOUTHERN RAILWAY: BRIGHTON—VICTORIA

	Engine, 2-6-0 No.		1799	1632
	Load, tons full		235	340
Distance		Schd.	min. sec.	min. sec.
miles		min.		
0.0	BRIGHTON ...	0	0 00	0 00
1.3	Preston Park ...	—	3 26	3 35
4.7	Milepost 46 ...	—	8 35	8 36
7.1	Hassocks ...	—	11 19	11 15
9.8	Keymer Junction ...	13	13 56	13 45
12.9	HAYWARD'S H'TH. ...	16	17 00	16 45
16.8	Balcombe ...	—	21 28	21 45
				p.w.s.
18.9	Milepost 31½ ...	—	24 03	24 18
21.4	THREE BRIDGES ...	25	26 40	27 10
24.9	Horley ...	—	29 40	30 25
29.0	Earlswood ...	32½	33 20	34 45
32.1	Quarry ...	—	36 30	38 15
33.4	Milepost 17½ ...	—	37 59	40 03
37.4	Purley ...	—	41 45	44 10
39.5	South Croydon ...	—	signs.	46 08
40.4	EAST CROYDON* ...	†45	45 57	47 00
43.4	Norbury ...	—	—	50 05
				signs.
46.2	Balham* ...	52	—	53 10
48.2	CLAPHAM JCT.* ...	55	—	55 40
50.3	Grosvenor Road* ...	—	—	signs.
50.9	VICTORIA ...	60	—	61 58
—	Net times (min.) ...	—	45	58½

* Service slack, moderate † 46 min. to stop

tunnel, 68 at Keymer, 48 at Balcombe, and, after a permanent-way check in Balcombe tunnel, 68 at Horley, 45 at Quarry, and 69 at Purley. After East Croydon there came checks which made the train 2 min. late into Victoria, but allowing 1½ min. for these and 2 min. for the Balcombe slowing, the net time was 58½ min. Thus the Moguls could just cope with the heaviest Brighton duties; as these records show, there was no great margin of power in such conditions, but the performances, for engines of such moderate dimensions, were very creditable, and the all-round capabilities of these engines are a considerable asset to Southern Railway operation.