FAMOUS TRAINS: X

The "Midland Scotsman," L.M.S.

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No. 12 The "Midland Scotsman," L.M.S.

First published in the Meccano Magazine December 1927

In this country the year 1927 has been one of railway record-breaking. Three out of the four great railway groups have each produced an express passenger locomotive design of greater power than ever previously attempted on the respective lines, and it was only a year previously that the fourth of the groups did the same thing. A working steam pressure of 250 lb. per sq. in., higher than ever previously employed in a British locomotive design, has been incorporated in two of the 1927 designs just mentioned. While these developments have been taking place in the locomotive power itself, new changes of a record character have been made in the working of the train services for which these engines have been designed.

Photo courtesy] The "*Royal Scot*" passing Leighton Buzzard ["*The Times*"

During the past year there has been a kind of "competition" in long-distance running. The world's record in daily non-stop journey distance, hitherto held for so many years past by the Great Western

Railway with their 225 ¾ -mile journey from Paddington to Plymouth, went doubly by the board last summer when the L.M.S. Company instituted non-stop running over the 236 miles between Euston and Carnforth, and the London and North Eastern over the even longer distance of 268 ½ miles between Euston and the Border City of Carlisle.

It is the *"Royal Scot"* Express – the subject of our consideration this month – that is responsible for this remarkable feat, and it is the new *"Royal Scot"* type of three-cylinder 4-6-0 express locomotive, which is one of the two new British types employing the record working pressure of 250 lb. per sq. in., that has made possible the institution of such a working. As a daily proposition of non-stop running this is far and away a world's record. On three earlier occasions Webb compound engines had essayed the feat successfully – first the three-cylinder 2-2-2-0 compound *"Iconic"* in 1896, and then a run in both directions by two four cylinder compound 4-4-0 engines of the "Jubilee" type in 1902 – but these were special trips for which special preparations had been made.

2-2-2-0 Dreadnought Class circa 1900.

Note the rear driving wheels are not coupled to the fore set of drive wheels resulting in the unusual wheel configuration.

There are also regular locomotive workings in force in various parts of the world of 500 and more miles continuously, on which, however, intermediate stops are made for changing crews, examination of train and taking in supplies. But never before in the world's history has one locomotive and crew been faced with continuous running of nearly six hours' duration, with a heavy express, at an average speed of 52 miles per hour throughout. Indeed, it is probably correct to say that only in Great Britain is the maintenance of locomotives and rolling stock so carefully watched that unbroken running of this character is possible without risk. One's only mild regret is that it has not been found possible to change engines at Kingmoor sheds instead of Carlisle Station, as that slight alteration would have lifted the length of run just above the 300-mile mark.

It had been intended to introduce the *"Royal Scot"* in the summer of last year, but the coal dispute made imperative a postponement until last summer (written in Nov 1927). The first idea was to cover the 230 miles from Euston to Lancaster without a stop, which would have been just

sufficient to beat the Great Western Plymouth run, but when rumours began to circulate that the London and North Eastern contemplated a journey over the 232 miles between King's Cross and Darlington, the L.M.S. "played" Carnforth instead, being a locomotive depot, was in some respects more suitable than Lancaster for engine-changing, and it also had the merit of being the long run from London to an end just before the beginning of the long climb up Shap.

Throughout last summer this run was maintained, the train engines being a four-cylinder 4-6-0 "Claughton," and the pilot a 4-4-0 of either the "George the Fifth" or the closely corresponding super-heated "Precursor" type. At Carnforth these were replaced by a couple of Midland three-cylinder compounds from the Polmadie shed in Glasgow, which covered the next stage of 130 miles between Carnforth and Symington, in Scotland without stopping. There the Edinburgh portion was detached from, or attached to, the Glasgow portion of the train. Not only did the latter run involve the previously unheard-of passage of Carlisle without a stop – certain night trains in the summer had hitherto missed the Citadel Station, but had always been halted at either the North Western or Caledonian engine-sheds to change engines – but it also involved the Scottish engines in the negotiations in succession of the 915-ft. altitude of Shap and the 1,015-ft. altitude of Beattock Summit, with an intermediate stop practically to sea-level just north of Carlisle.

Leading Dimensions of 3-cylinder 4-6-0 Express Locomotives, "Royal Scot" Class

Cylinders (3) Diameter	18 in.
Stroke	26 in.
Driving Wheels, Diameter ...	6 ft. 9 in.
Heating Surface, Tubes	1,892 sq. ft.
Firebox	189 ,,
Superheater ...	445 ,,
Total	2,526 ,,
Firegrate Area	31.2 ,,
Working Steam Pressure ...	250 lb. per sq. in.
Tractive Effort (at 85 per cent. working pressure)	33,150 lb.
Adhesion Weight	62½ tons
Total weight of Engine	85 ,,
Water Capacity of Tender	3,500 gals.
Coal ,, ,, ...	5½ tons
Weight of Engine and Tender (in working order)	127⅜ tons
Length of Engine and tender overall	63 ft. 3 in.

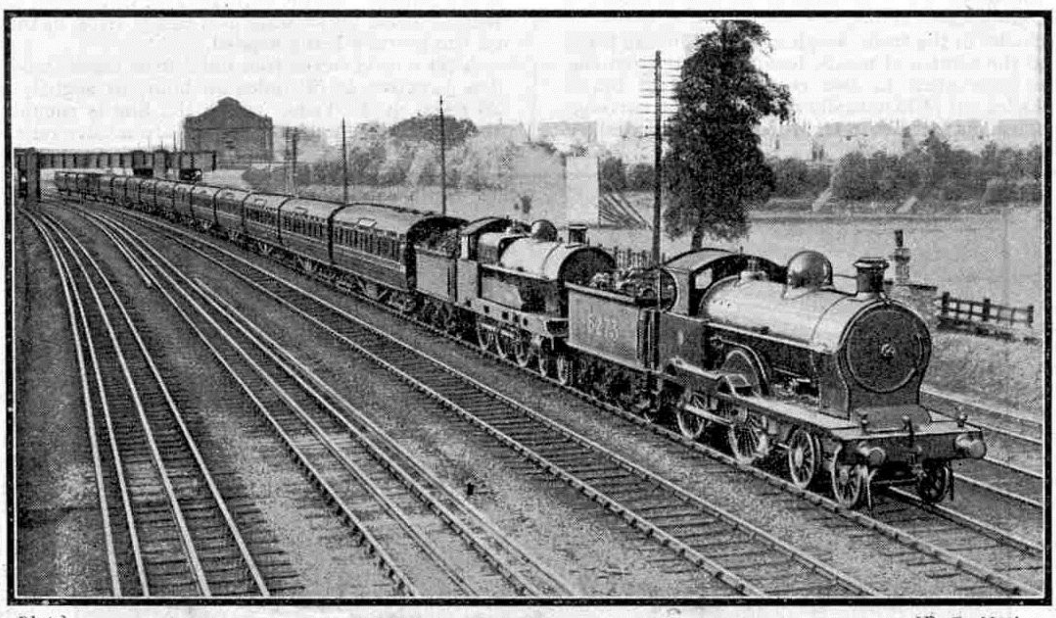
During the summer, however, the Scottish compounds did splendidly with this train, gaining time almost invariably with a train whose minimum formation was 15 bogie coaches, not infrequently mounting to 16 and even 17 coaches. These Northern engine workings were "balanced" by certain altered night schedules in order that the compounds might not have to remain idle at Carnforth for over 24 hours. Thus the 10.30 p.m. out of Glasgow was worked over the 165 ½ miles from Glasgow to Carlisle nightly without stopping, and the 9.20 p.m. night express from Euston ran through from Carnforth to Carstairs, in both cases, of course, giving Carlisle the "go by."

Meanwhile, however, the L.N.E.R. had rather taken the wind out of the L.M.S. sails by instituting their run between King's Cross and Newcastle. In justice to the L.M.S. it must be remarked that the L.N.E.R. run was made on but four days a week and in one direction only. It was, moreover, at a slower average speed, and was withdrawn when the winter train service came into force at the end of September. At the same moment railway circles were electrified by the unheralded announcement of the L.M.S. Company that in future the *"Royal Scot"* would make no halt between London and Carlisle.

It may be taken as tolerably certain that this is the "last word" in the controversy. In order to beat the distance to Carlisle the Great Western would require to run non-stop over the 305 miles

from Paddington to Penzance, for which journey, even if desirable, a sufficient daily passenger load could never be obtained to make the feat a paying proposition. Similarly the L.N.E.R. would need to run from King's Cross to Berwick. There are such formidable objections to an further extension of the distances covered without intermediate stop – chief among which are the strain on the crew, no less than on the machine, and the lack of opportunity of examining the train –that, as I have said previously, the L.M.S. record is not in the least likely to be challenged.

With the institution of the non-stop journey to Carlisle the L.M.S. locomotive authorities have introduced the *"Royal Scot"* locomotives. Piloting has ceased at the same time, and while the working of a 15-coach express train over Shap Summit without assistance does not constitute a record, it is certain that never previously has such a tare weight as 417 tons been worked up the far steeper 10 miles of Beattock Bank without the help of a banker. The merit of the ascent of Shap from the Southern side – which is considerably steeper than the Northern – is further enhanced in that it has to be tackled by the engine after the latter as been in continuous running for 4 ½ hours, when the fire is getting dirty and clinker may be forming on the firegrate.



Photo] Up "*Royal Scot*" passing Kenton. Engines Nos. 5273 and 5989 *[F. E. Mackay*

To institute such an innovation as this running at the beginning of the winter is, indeed, rather a daring stroke, seeing that, while the load has been reduced for winter working, the probability of bad weather with its adverse effect on the running has to be borne seriously in mind. Fog over the southern stages of the run, or gales sweeping over the exposed lengths of the line along the shores of Morecambe Bay or up in the lofty altitudes of the Westmoreland hills, may prove a serious problem to the crew on a mid-winter day. Whether this remarkable working continues permanently in force remains to be seen.

Nothing of more handsome external appearance could be imagined than this magnificent train, with its coaches uniform in size and outline, each bearing on the roof sides the neat legend *"The Royal Scot,"* in black letters on a white ground, and with both carriages and engine of the same familiar "Midland red" colour. The standard summer formation, as previously mentioned, consisted of 15 coaches, weighing empty 417 tons. Backward from the engine there were nine vehicles for Glasgow, consisting of bogie brake, corridor first, open first-class restaurant car, kitchen car, two open third-class cars in succession (one reserved for meals only), two open third-class corridors and a third-class brake; and then for Edinburgh first-class corridor brake, open first, Kitchen and open third restaurant car set, third-class corridor coach and third-class brake.

No less than six vehicles in the train weighing in all 170 tare tons, were thus devoted to the service of meals, leaving, apart from the three brake coaches (equivalent to two coach-lengths of brake space) only seven vehicles out of 15 actually devoted to the carriage of passengers. The enormous increase in train-weight represented by the present 10 a.m. and 10.7 a.m. expresses out of Euston – as compared with the previous one train only at 10 a.m. – is thus explained.

For the winter the train has been cut down to 12 vehicles. One of the third-class corridor coaches has been withdrawn from the Glasgow portion and the Edinburgh portion consists of first-class brake, composite twelve-wheeled restaurant car, open third-class car and third-class brake, which reduces the tare or empty weight of the train to 350 tons. With an average complement of passengers and luggage this represents about 365 tons, whereas the total weight in summer was more like 440 tons, and occasionally, when the load was made up to 17 coaches, must have exceeded 500 tons.

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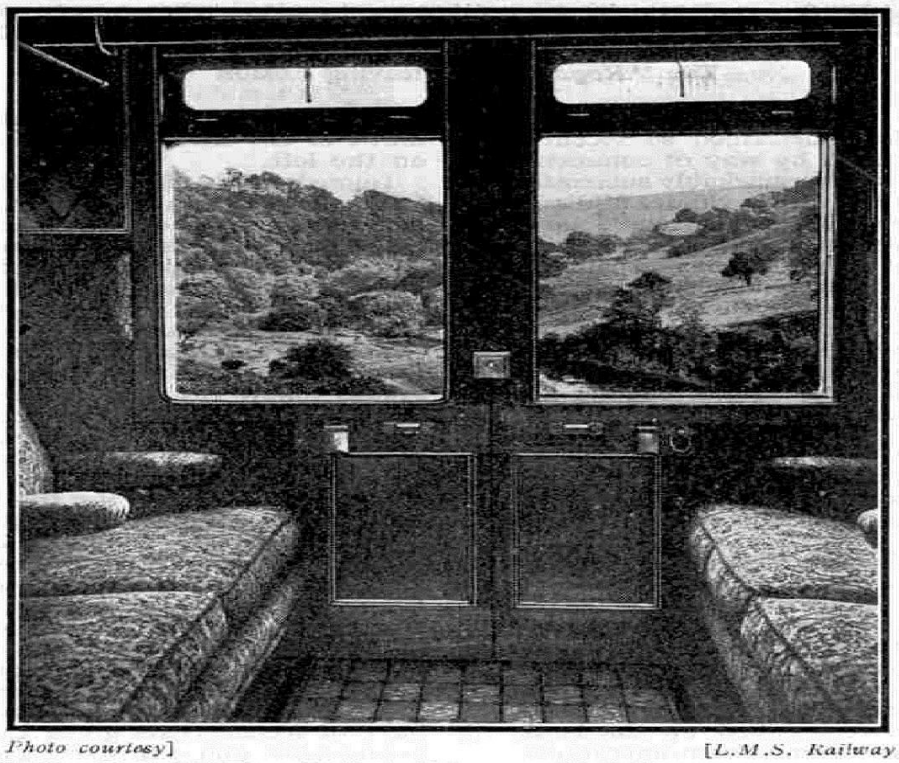
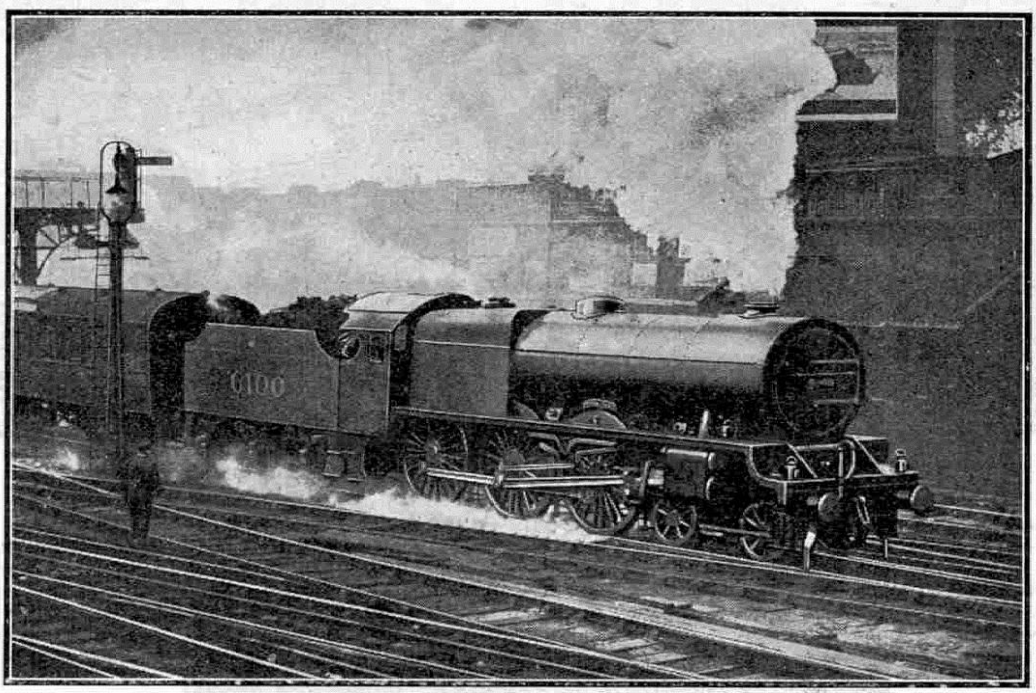


Photo courtesy] *[L.M.S. Railway*

Interior First Class corridor coach, "*Royal Scot*"

The *"Royal Scot"* engines have been described so recently in the "M.M." (Meccano Magazine) that little further is needed by way of comment. The only matter for surprise is that, after the remarkably successful experience of the L.M.S. Company with the three-cylinder Midland compounds, three-cylinder simple propulsion should have been adopted without so much as an experimental building of an engine of this type on compound lines. The only previous experience of any section of the L.M.S. with three-cylinder simple working was that of the Caledonian, where, however, the big Pickersgill three-cylinder 4-6-0 engines have not proved as successful as anticipated, the cost of maintenance in particular being somewhat heavy.

As compared with the other British express locomotive giants of recent date, too, the cylinders of



Photo] The "*Royal Scot*" leaving Euston *[Topical Press*

the new L.M.S. engines are somewhat on the small side, with the result that, despite the high working pressure of 250lb. per sq. in., their tractive effort is less than that of either the Great Western new "Kings," the rebuilt L.N.E.R. 4-6-2 engine *"Enterprise,"* or the Southern *"Lord Nelson."* But actual performance is the truest test of tractive capacity and in this respect it is clear that the new *"Royal Scots"* leave little to be desired.

The only assistance that will be taken throughout the north-bound journey – unless, possibly, the weather should prove very bad over the mountainous sections further north – is up the incline from Euston to Camden. This begins right off the end of the platform and is for 1 ¼ miles at between 1 in 70 and 1 in 105. At the opening of the London and Birmingham Railway it was never supposed that the ordinary adhesion locomotive would surmount such a grade without help, and a winding engine was installed at Camden by which outgoing trains were pulled up the bank before the engine was attached that was to draw them northward. The same practice obtained until a much

later date up the 1 in 42 of Cowlairs bank out of Queen Street Station at Glasgow. In both cases rope haulage has long since been abandoned in favour of rear-end assistance by the engine that has brought the coaches into the terminus.

Thus aided, we mount Camden bank with ease, and have now before us no grade of steeper inclination than 1 in 330 for the next 150 miles. As far as Crewe, or even Warrington, indeed, the West Coast main line has for its length, the finest and flattest grading in Great Britain, with the exception of Brunel's old main line of the Great Western from Paddington to Swindon, Bath, Bristol and Taunton. In the earliest stages of the run, therefore, the miles will be reeled off steadily and easily, little in the way of comment on the journey being needed.

After a level run of four miles from Camden we shall pass Willesden Junction at 60 miles an hour, or slightly under. The next 26 miles up to Tring, where the line is roughly on a level with the top of St. Paul's Cathedral, are mostly on the ruling up-grade of 1 in 330, with a break of about three miles past Watford where again we shall touch or slightly exceed the mile-a-minute rate. The sustained up-hill speeds will be round about 50 miles an hour. Schedule times allowed are 10 min. to Willesden, 24 to Watford and 41 to Tring, where we are 31 ¾ miles from Euston. In the course of this initial stage we have taken water from the first of nine sets of track-troughs between Euston and Carlisle, these being located at Bushey.

Once over Tring Summit we have before us a booking of 14 min. for the 15 miles from Tring to Bletchley, and may attain here a speed of 70 an hour or slightly over between Cheddington and Leighton. The line is level or falling as far as Wolverton, where the large carriage works at which so much of the L.M.S. passenger stock is turned out may be seen on the left.

Immediately after this there come Castlethorpe troughs, followed by a 1 in 330 ascent to Roade, noted for its remarkable cutting, 80 ft. in depth. Here we are 60 miles from the start, which have required 68 minutes of running time. At Roade the Northampton loop line leaves on the right reminding us of the early opposition to railways that has now for all time carried the West Coast main line some three miles away from the country town, to the serious loss of the latter.

The Northampton loop comes in again at Rugby and meanwhile our main line converges from four tracks to two. Easy grades follow through Blisworth and Weedon, with a rise from the latter to Kilsby Tunnel, during the ascent of which the Daventry Station of the B.B.C. is a prominent object on our left. Immediately after Kilsby the far more imposing Government wireless station at Rugby bears into view on the right. Speed must be reduced to 40 miles an hour for the passage of Rugby. We now have covered 82 ½ miles in 92 minutes from the start.

At "Rugby No. 7" signal box, half a mile beyond the station, the original London and Birmingham Railway leaves us on the left and we shall not rejoin it until Trent Valley Junction, just before Stafford. The Trent Valley line, as it is called, only saves 7 ¾ miles in distance over the old route, but it avoids all the congestion through Birmingham and Wolverhampton. It consists of a series of gentle up-and-downs, the points of maximum speed being Nuneaton and Polesworth, where we may again reach the "70" level. Beyond the latter station adjacent colliery workings have of recent years given trouble to the railway in the way of subsidences, and our speed probably will be moderated between Polesworth and Tamworth. Water has been taken from troughs just beyond

Rugby, and at Hademore, between Tamworth and Lichfield; the next supply is obtained at Whitmore, 148 miles from the start – the summit of a gentle rise from Stafford.

A time of 54 minutes amply suffices for the 51 miles from Rugby to Stafford, where speed is reduced to 40 m.p.h. for the junction with the Birmingham line. Then 18 min. is allowed for the 14 miles up to Whitmore and 11 min. for the 11 ½ miles down to Crewe. From Madeley down to Betley Road is the steepest grade since Camden – three miles at 1 in 177 – which may produce a maximum rate of 75 an hour, ere we roll slowly through Crewe Station at 12.55 p.m. We have covered 158 miles.

From Stafford to Crewe is four-track main line, and this has now been extended over a good proportion of the ensuing 51 miles to Preston. At first the gradients are favourable beyond Crewe, as far, indeed, as Warrington, but there is a sharp rise for two miles at 1 in 132 beyond Winwick Junction, and from Wigan up to Boar's Head the gradient is as steep as 1 in 104 for roughly the same distance. Despite slight easing of the speed through Weaver Junction – where the Liverpool line diverges – Warrington, Wigan and Euxton Junction, however, the 51 miles from Crew to Preston, begun and ended at a very low speed, must be covered in the even hour.

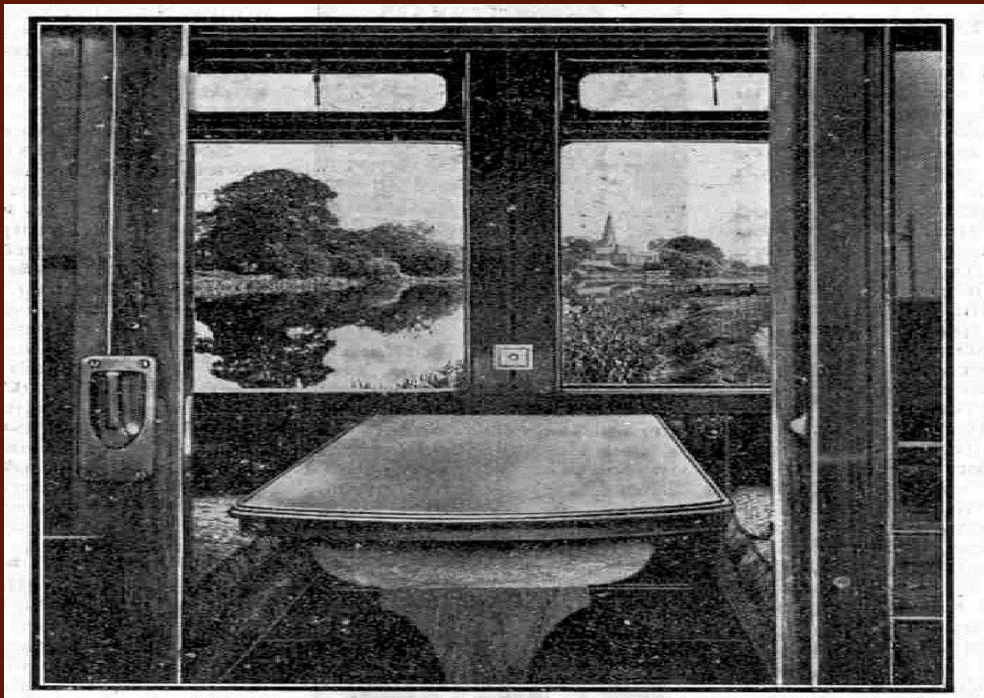


Photo courtesy] *[L.M.S.*

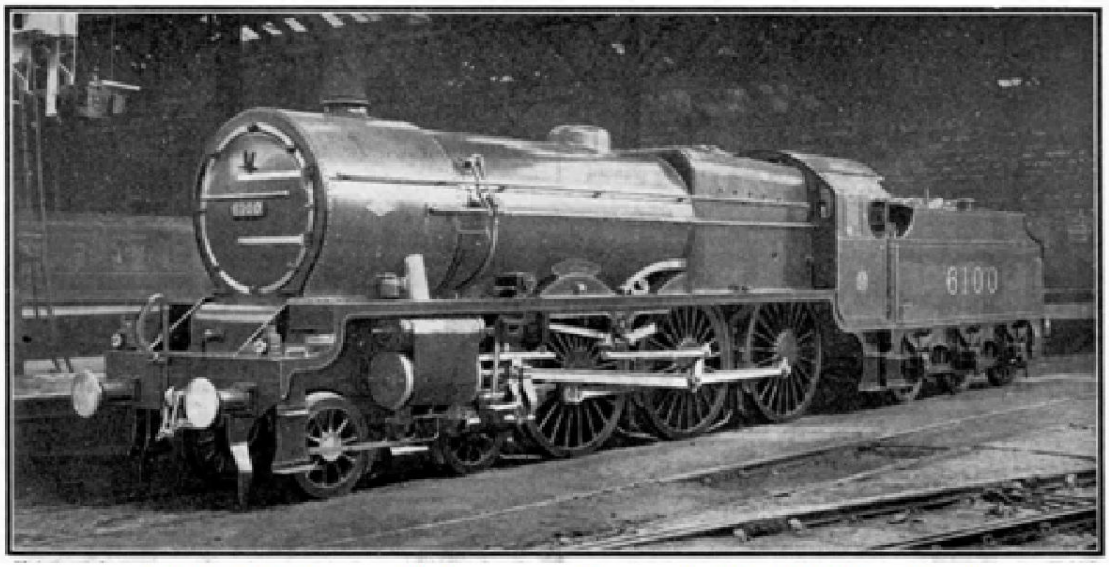
Interior First Class corridor coach "*Royal Scot*"

Speed must be recovered up a short but very steep incline out of the great station of Preston, but then follow some 20 miles of practically level line, terminated by a mile descent at 1 in 96 round some sharp curves into Lancaster, whence we soon strike the shore of Morecambe Bay at Hest Bank. This two or three miles of seashore gives the West Coast passenger his only actual glimpse of the West Coast of Great Britain throughout the journey. Between Crewe and Carnforth, now about to be passed, there are three sets of track-troughs – at Moore, just before the line rises

on to the high bridge of the Manchester Ship Canal, near Warrington; at Brock, eight miles beyond Preston; and at Hesk Bank. Carnforth, 236 ¼ miles from the start, is passed at 2.24 p.m.

Now comes the ascent to Shap. It is in three stages – first a short climb for 2 ½ miles at 1 in 134, followed by a level strip from Burton to Milnthorpe; then the 13 miles of Grayrigg Bank steepening from Oxenholme to an average of 1 in 131 for 7 miles and finishing with two miles at 1 in 106 up to Grayrigg Station; then again some five miles of level through a fine mountain gorge until, just after Tebay, we strike the final pitch, which is for four miles at 1 in 75 to Shap Summit. The *"Royal Scot"* is not unduly hurried on this 900-ft. climb; the schedule allowance over the 31 ¾ miles from Carnforth to Summit is, in fact, 47 min., after which a swift run of 32 minutes carries us over the remaining 31 ¼ miles into Carlisle. Speed will fall, probably, to 30 miles an hour or so in the ascent of Grayrigg Bank, and after a maximum of 60 to 65 an hour through Tebay we may fall yet further to a slow a figure as 20 an hour before breasting Shap Summit.

Should the express be behind time, we may attain a high speed in descending the long 1 in 125 from Shap to Pentith, even in excess of 80 miles an hour, but the speed is not generally allowed much to exceed 70 an hour. Carlisle is reached at 3.45 p.m., and our "Royal Scot," with his crew is doubtless glad enough to hitch off and amble away to the engine-shed for a well-earned rest.



L.M.S. 4-6-0 three-cylinder express locomotive No. 6100 *"Royal Scot"*

Another *"Royal Scot"* now takes his place. Getting away from Carlisle at 3.50 p.m., the new engine has a comparatively easy schedule ahead, Beattock Bank notwithstanding, the 102 ½ - mile journey being allowed 140 minutes. Beattock Summit divides the 100 miles into two almost equal parts, being 49 ¾ miles from Carlisle. For the first 39 ¼ miles to Beattock Station, where in the old days the stop was made for the "banker," the ruling grade is 1 in 200. This occurs in no inconsiderable stretches, some 15 ½ miles in all of the distance being upward at the inclination mentioned, more particularly between Gretna and Lockerbie. But this is nothing to the "Bank" itself, which rises from Beattock for 10 miles continuously at between 1 in 88 and 1 in 69. For the 39 ¾ miles from Carlisle to Beattock 48 miles are allowed, but the ensuing 10 miles require 21 minutes

and it is quite possible that a minute or two gained between Lockerbie and Beattock may be added to the climbing time.

In the next 2 ¼ miles the railway drops at 1 in 99 into the valley of the Clyde, and remains in it, more or less, all the way to Glasgow. Actually the river is crossed six times – at Elvanfoot, Crawford, Lamington near Carstairs, Uddingston and then just as the railway enters the Central Station at Glasgow.

After Elvanfoot the fall is gradual for 10 ½ miles at Lamington, and then there are undulations for 15 miles past Symington and Carstairs to Craigenhill Summit, whence there is a steep and continuous fall for 15 ½ miles at between 1 in 99 and 1 in 135, to Uddingston. High speeds are seldom attained on these falling grades, going north, as the descent from Beattock Summitt to Lamington winds considerably, and down from Craigenhill coalmining country is traversed, which means moderate speed on account of subsidences. So speeds much in excess of 60 m.p.h. are unlikely, and cautious travelling is amply allowed for in the schedule of the train.

Twice between Carlisle and Glasgow it is possible to take water from track-troughs, which a couple of years ago were laid for the first time in Scotland near Floriston, about seven miles from Carlisle, and just south of Carstairs, in preparation for the long West Coast runs since instituted. Eleven sets of track-troughs in all are therefore available over the 401 ½-miles' journey between Euston and Glasgow.

Mention has been made previously of our departure from Carlisle at 3.50 p.m.; 4.38 p.m. should see us through Beattock and 4.59 p.m. breasting Beattock Summit, at a speed of between 20 and 25 or 30 miles an hour. At 5.17 p.m., having covered with ease the 17 ¼ downhill miles from Summit in 18 minutes, we are drawing up at Symington, under the shadow of the bold Lowland summit known as Tinto Hill. Passengers are not allowed to leave or join the train either here or at Carlisle – the *"Royal Scot"* is, indeed, a strictly "limited" express, conveying passengers for Glasgow and Edinburgh only – but the stop is for the purpose of detaching the Edinburgh portion, for which we shall see waiting, in all probability, a Caledonian 4-4-0 engine.

At 5.20 p.m. we are away again, and as 50 minutes proves all too ample an allowance for the 35 ½ miles from Symington down to Glasgow, the chances are that, given a clear road, we shall finish our journey before time. Last time I travelled on the train we rolled into Central Station at 6.3 p.m., no less than 12 minutes early by the public arrival time of 6.15 p.m. In the working timetables the scheduled time of arrival is 6.10 p.m.; but so easy is the task of haulage to the new *"Royal Scot"* engines that a booking of 7 ¾ hours from London or even less, would cause them little concern. Let us hope that, ere long, it will be possible to travel from London to the chief Scottish cities at a throughout average speed of 50 miles an hour and that the *"Royal Scot"* will be one of the trains to do it!

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