

PART II.
PAPERS.

9TH MARCH, 1905.

ADDRESS BY THE PRESIDENT.

JOHN SCOULAR.

In opening the Thirty-fifth Session of this Association, my first duty is to thank you for the very high compliment bestowed upon me, by electing me to such an honorable position as that of your President for the ensuing Session, and I trust that with the support of an energetic Council, and members generally, the success which has followed the efforts of my predecessor, will be fully sustained throughout this Session.

In briefly referring to a few matters concerning the Association, it may be mentioned, that in the Annual Report of your Council, copies of which were forwarded to all members, the exact position of affairs were clearly indicated up to September 30th, the end of the financial year. Since then the Annual Meeting has been held, and several matters have transpired, which may be of interest to mention.

During the last Session, seventeen new members were elected, seven resignations were accepted, and one ceased to be a member, showing an increase of nine members.

Since the end of the Financial year, seven have ceased to be members, and Mr. James Barnett, a highly-respected gentleman, who at all times manifested a great interest in affairs concerning the welfare of this Association has been lost by death.

During the year 1904, including the Annual Meeting, nine general meetings were held, at which there was an average attendance of forty, and a keen interest was shown by the members in all papers read, most of which produced lengthy and animated discussions.

Two Excursions were made during the year, one to the Works of Messrs. Lever Bros., Balmain; and the other to Messrs. Hornsby & Sons, for the inspection of an oil engine at work.

The Annual Dinner was held at the A.B.C. Cafe, on November 4th, '04, at which there was a good attendance, and the Reunion was of a very pleasant and enjoyable character.

With regard to finance, it may be mentioned that after providing for all expenses, and writing off £7 15s 7d for unpaid subscriptions, etc., there was a balance in hand of £114 16s 5d at the end of the financial year.

Since that time, however, your Council have made special efforts to augment the funds of the Association, by dealing with the question of members in arrears, the result of which has been fairly satisfactory.

It is to be hoped, therefore, that during the present Session sufficient funds may be found available to complete the work of binding up the whole of the back numbers, and bringing the proceedings right up to date.

With regard to the scheme for delivery of a series of lectures on British Engineering and other subjects, and which was brought so prominently before the members of this Association by my predecessor, in his Presidential Address last year, I may mention that arrangements have now been made for two of these lectures to be delivered here at an early date.

The subjects chosen by your Council are, "British Progress in Gas Works, Plant and Machinery," by C. E. Brackenbury, C.E., the author of "Modern Methods of Saving Labour in Gas Works," and "British Progress in Pumps and Pumping Engines," by Phillip Pjorling, Consulting Engineer, author of "Pumps, their Construction and Management."

As each lecture will be illustrated by lantern slides, so as to bring out more clearly all points of interest, it is to be hoped, that appreciation of your Council's efforts will be

shown by a full attendance of members at the reading of these lectures.

In delivering my first Presidential Address, naturally the temptation has presented itself to indulge in a historical retrospect of the progress and development of the Locomotive, and the advancement that has been made in Locomotive Workshop Practice, since the introduction of the first Locomotive on the Railways of this State, and though it may be necessary to refer to historical matters in an incidental way, so that any special points to which your attention may be directed will be more fully illustrated, I will endeavour to confine my remarks, on this particular occasion, to the progress and development that has been made during the past 25 years.

Briefly, some reference may be made to the position of affairs as they stood at the end of December, 1879, at which period there were 177 locomotives in stock, consisting of 83 goods, 73 passenger, and 21 side tank engines. (See Table I., appended.)

The lines of railways then open consisted of $228\frac{1}{2}$ miles on the Northern section; 311 on the Southern section, and 195 on the Western section, representing a total of $734\frac{1}{2}$ miles.

Plate I. shows a plan of the Main Workshops site, which, at that time, was situated in Redfern Yard, and covered an area of about $1\frac{1}{4}$ acres.

Other workshops, situated at Newcastle, with an area of about $\frac{3}{4}$ of an acre, were then used for repairing engines on the Northern Lines, this being necessary through the Main Line from that locality not being connected up to the Sydney section, and though these shops are still used for ordinary repairs, all work of fitting new boilers and rebuilds, are now carried out at Eveleigh.

Though many of the engines in service at that period would compare somewhat unfavorably with those of more modern design, still there are a number of them running at present, and doing useful work.

The tendency has been, however, in ordering new engines, to follow the course generally adopted throughout America, and more recently in Great Britain and on the Continent, by increasing the cylinder power and size of the Locomotives, and apply larger boilers, with a corresponding increase of pressure, heating surface, and grate area; and when it is taken into consideration the advancement that has been made on these railways in this direction, though not perhaps to such an extent as in America, there is every reason to feel satisfied with the results that have been attained through the adoption of this Policy, whereby there are now a number of engines in service which will compare favourably for power and speed with many of those in use on the various railways throughout the world.

Between January, 1880, and the end of 1888, prior to the advent of the Railway Commissioners, 251 engines were introduced, somewhat more powerful than many of those previously in service, and they consisted of the following:—

Goods Engines.	Passenger Engines.	Tank Engines.
34 A Class	38 C Class	18 F Class
70 B „	47 D „	6 Q „
10 K „	12 H „	6 (285) „
	10 L „	

It may be of interest to mention that 32 of these engines, 18 goods, 6 coupled A class; eight passenger, 4 coupled C class; and 6 side tank, six coupled, 285 class, were manufactured in this State by outside Firms between 1882 and 1887.

Though some improvement had been made by increasing the aggregate tractive power during the period mentioned from 2,442,062lb to 6,509,725lb, still it was not until the latter period, when the management of the Railways was

vested in the Railway Commissioners, that prominent developments were made.

Of the 428 engines that were then in stock, five of them had been in service over thirty years; twenty-nine for periods ranging from twenty-two to twenty-six years, and the mean age of more than one-third of the entire stock was $15\frac{1}{2}$ years.

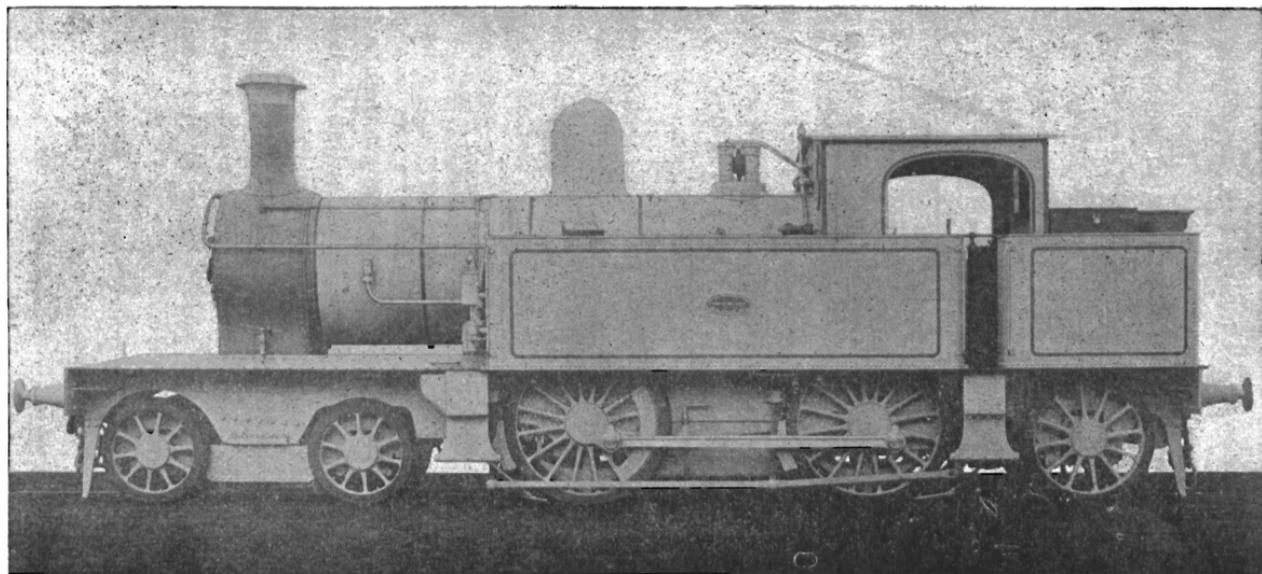
Many of these engines, though serviceable in their time, had now become unsuitable, and practically worn out, while others were in urgent need of repairs.

It therefore became apparent, and absolutely necessary, to order new engines to take the place of some of the worn out or inferior types, and provide additional power, so as to meet the increasing traffic requirements, and the extension of new lines. This was done by ordering from Great Britain and America, 154 engines of different types, the delivery of which was carried out, within a period of four years after the Commissioners had taken office, as follows:—

25 B	Class, ordinary goods	put in service 1891
12 E	„ side tank for mineral traffic	„ „ 1891
20 J	„ heavy goods	„ „ 1891
20 I	„ saddle tank for mineral traffic... ..	„ „ 1892
15 M	„ side tank for suburban passenger	„ „ 1891
12 O	„ heavy express passenger	„ „ 1891
50 P	„ „ „ „ „ ..	„ „ 1891

The M class suburban passenger engines introduced at that time, were considered the most suitable class for the traffic requirements, under prevailing conditions. They contained a number of improvements on those previously put into service, and in many respects represent a type of engine used in operating similar passenger traffic on some of the British Railways.

They are of the four-wheel coupled type, with a four-wheel bogie at the front end, and a single radial bogie at the hind end, and known as a side tank engine. The cylinders, steam chests, and ports are placed inside the frames. The



"M" CLASS SUBURBAN TANK ENGINE.

slide valves are of the ordinary type, operated by Stephenson's valve motion, and controlled by screw reversing gear, and the engine is thoroughly equipped with Westinghouse Automatic and hand-brake gear. The boilers are of the ordinary type, constructed of steel, with copper tubes, and fireboxes fitted with brick arches. The tanks are arranged at the side of the engine, with a gangway at each side for access to the enginemmen, platform, and a coal bunker at the hind end (See Photo Print).

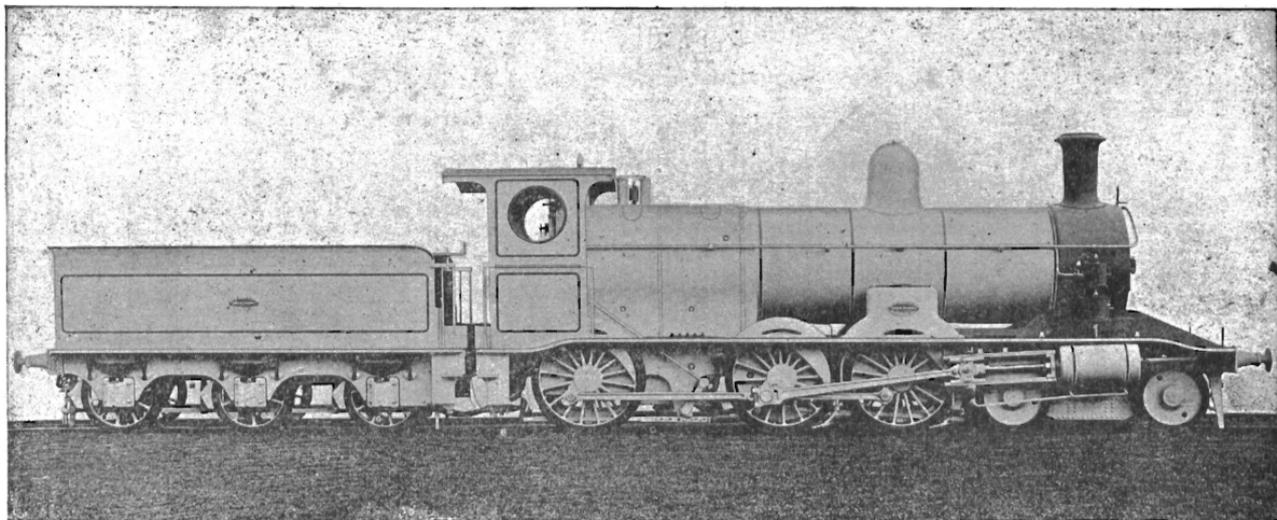
The P class heavy express passenger engines, put in service about the same time, were the result of a decision arrived at by the Railway Commissioners, when it was found necessary, from experience gained, to meet the demands of traffic, by introducing more powerful locomotives for the purpose of economical working over extensive single lines, comprised of heavy grades and sharp curves, by increasing the weight of trains, and reducing the train mileage.

With this object, it was decided in 1890 that engines suitable for meeting these requirements should be designed specially for heavy express passenger service, and fifty of them, constructed by Messrs. Beyer, Peacock & Co., Manchester, were obtained on the first order. They are of the six-wheel coupled type, with a four-wheel bogie at the leading end, and embody the main features of English practice, in details and general construction.

The boilers are of the Belpaire type, constructed of steel plates, with internal fireboxes, and tubes of copper; and extended fire-brick arches are provided for the purpose of the free combustion of fuel.

The tenders for these engines are carried on six wheels, the leading pair and the centre being compensated, for the purpose of easy riding.

Both engine and tender are thoroughly equipped with the Westinghouse Automatic brake, and screw hand-brake gear,



" P " CLASS PASSENGER ENGINE AND TENDER.

and every provision has been made for large and efficient wearing surfaces, and where possible the journals, crank pins, &c., are protected by dust shields, the engine and tender throughout being provided with the most modern means and appliances for the purpose of lubricating all moving parts and wearing surfaces. Steam sanding gear is applied to the engines and ordinary hand-sand gear to the tender. (See Photo Print.)

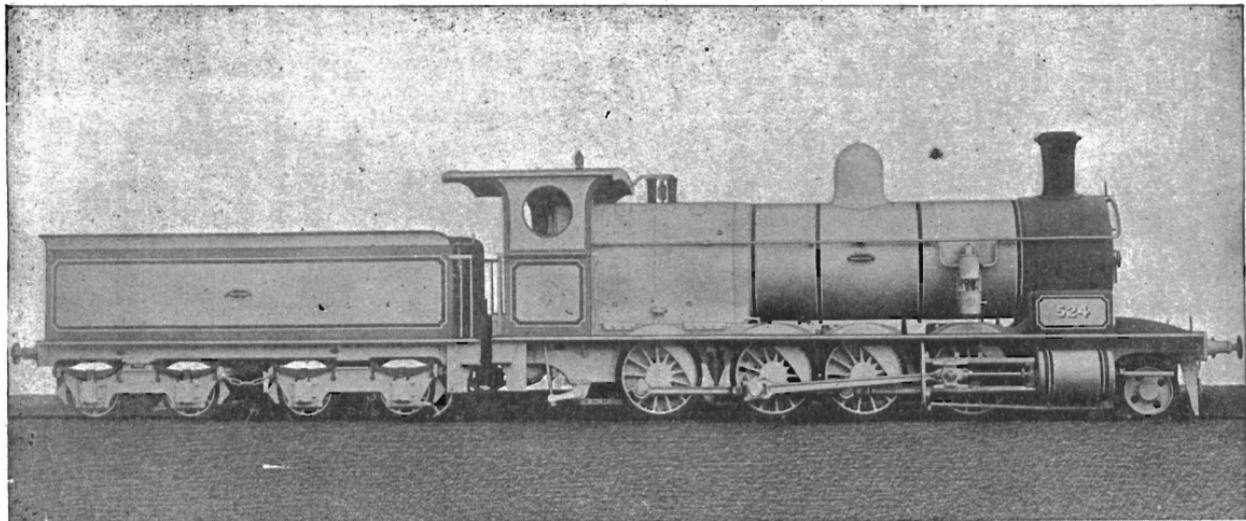
Twenty-five more of these engines were ordered in 1899, the first of which was placed in traffic in October, 1901, and are practically the same class of engine, except some slight modifications in details, but the tenders of these engines are of the double bogie type, duplicates of those supplied with the heavy goods' engines, first imported in 1896.

HAULAGE POWER (Exclusive of Engine and Tender).

When working passenger trains.			When working goods trains.	
Grade	Tons	Speed per hour.	Tons	Speed per hour.
1 in 40	225	20 miles	275	10 miles
1 in 60	270	25 "	415	10 "
1 in 75	260	30 "	505	12 "
1 in 100	255	35 "	600	15 "
1 in 150	330	35 "	700	18 "

The necessity of revising old stock was not lost sight of, and attention was also directed to repairs and renewals of the most serviceable types of the old engines, which, in some instances, amounted to practically rebuilds, owing to the fact that new boilers had to be applied, over and above carrying out repairs of a very heavy nature.

Four heavy eight-wheel coupled goods' engines were re-designed, and constructed in the Eveleigh Workshops, between 1893 and 1895, and following closely upon these, arrangements were made to re-design and convert some passenger tender engines (of the C class) to side tank engines for



"T" CLASS HEAVY GOODS ENGINE AND TENDER.

suburban traffic, the first of which was completed at the end of 1895, and there are now 20 of these in service, 14 of which are fitted with Belpaire boilers, and are known as the CC class.

The T class heavy Goods' engines were introduced, as the result of several years' experience gained by the use of the American Engines of a heavy type, when it was found necessary to specially design a class of engine suitable for meeting the goods traffic requirements, run under practically the same conditions, and over the same roads as the P class engine, previously described. This led the Railway Commissioners to decide upon ordering a supply of engines from designs and specifications prepared at the Locomotive Offices in Sydney, the outcome of which has been a most powerful type of engine, and in every respect upholds the decision arrived at, both in economical working and repairs. They were first introduced in May, 1896, and there are now 95 of them in traffic, all of which have been supplied by British builders. In design they embody the general features of English practice, with the American system of balancing the weight on the springs, and are of the eight-wheel coupled type, with a single axle Bissel truck at the leading end, an arrangement known in America as the "Consolidation."

The boilers are similar in all respects, though somewhat larger than those for the Passenger engines.

The tenders are carried on double bogie trucks, a feature, at the time they were first introduced, comparatively new in English practice, but necessitated by the large capacity, and the sharpness of many of the curves on the mountain lines of these Railways. Both engine and tender are thoroughly equipped with the Westinghouse Automatic and hand-screw brake gear, and every provision has been made for large and efficient wearing surfaces, dust-shields, lubricating appliances, &c., and hand sand gear is applied to both engine and tenders (See Photo Print).