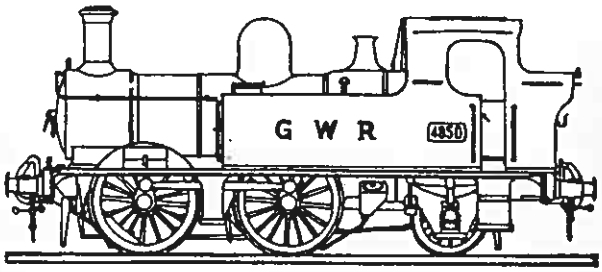
THE MARLOW DONKEY



Nº 46 JUNE 1988

Newsletter of the MARLOW & DISTRICT RAILWAY SOCIETY

CHAIRMAN'S NOTES

Twenty years ago and twenty years after Nationalisation British Rail announced a date to end officially the Age of Steam in Great Britain. I wonder who chose this particular day, August 11th 1968. It is hardly a date to be put into children's history books with 1066, 1805 and 1945, but it is surely to be remembered by railway buffs whose memories reach back to steam trains turntables and water-troughs. I have just been browsing through a copy of Railway World for August 1968. The editorial hailed a BR future of diesel and electric but pledged itself to continue full steam coverage. The Keighley & Worth Valley had just opened as a preserved line, down in Devon the Dart Valley company were awaiting a Light Railway Order, and up in North Wales the Festiniog Railway were running trains as far as Ddault. In the "Locomotives Withdrawn" section was a list consisting mainly of Black 5's, Stanier 2-8-0's and several 9F's. BR's sole contribution to the end of steam was to run several short excursions behind Black 5's, up in the north-west of England. I seem to remember lucky passengers were charged £15 each for this privilege. I can now look through "Railways Restored" and see how much has been salvaged from that sad era. There was an aura of resignation in the 1968 magazine and little hint of what enthusiasm and sheer hard work could do to give future generations living museums of how things used to be.

Trevor Radway and his wife, Margaret, came to our Society's meeting in April. As Vice-Chairman of the Dean Forest Railway Society Trevor gave us a brief history lesson about the origins of the Severn and Wye Railway, from its early horse-drawn trains to the inevitable closure. A section of the line has been saved and steam trains carrying tourists are regularly run. Compared to the Bluebell and Severn Valley Railways the operation is small time. They have an ex-GW "Hall", five prairie tanks and a pannier, together with seventeen carriages and a very useful little engine called "Basil".

This talk was planned to encourage our members to travel up to the Forest of Dean on 10th July. It should be a day to remember and we hope that the deluge that marred our Swanage outing is not repeated. Travelling over the Severn Bridge we may have time to see the old station at Tintern, happily preserved, and the caves at Clearwell. On the return we intend to visit Symonds Yat, a beauty spot on the River Wye.

Local man, Francis Blake, was the brains behind the rescue of the Barry engines. I was delighted to read the tribute to him in the May edition of "Steam Railway". The headline says all:- "The man who really emptied Barry scrapyard". Several years ago I wrote to him and in his reply he told me that Barry had one more pannier tank remaining. "Buy it for your Society" he said, "BR may close the Marlow Donkey and then you'll have the opportunity of operating the branch!" I don't know how much money Stan had in the bank at that time, but it was a well-intentioned idea.

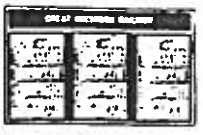
The Great Western Railway had 112 years of independent existence and then continued after 1948 to remain very much as it had been for a number of years more. The only visible sign of change of ownership was the horrible lion and wheel logo on the tenders of the larger engines. During the GWR years there were only SIX Chief Mechanical Engineers. Before 1916 these men were known as Locomotive, Carriage & Wagon Superintendents. The CME's all came from different backgrounds, with the exception of Swindon-trained Hawksworth, but they maintained a continuity of design. The other three members of the Big Four differed from the GWR as they were amalgamations of companies. Swindon merely absorbed smaller lines, mainly those of South Wales. Charles Collett's assistant, William Stanier, left Swindon in 1932 for the London Midland & Scottish Railway where more than a suggestion of GW practice appeared in his Black 5's, Jubilees and rebuilt Scots. The average library might produce a book on Isambard Kingdom Brunel, possibly a life of George Churchward, but to learn more of Gooch, Armstrong and Dean, or of Collett and Hawksworth is virtually an impossibility. Now, at last, a new book, "Locomotive Engineers of the GWR", by Denis Griffiths, produced by Guild Publishing, has appeared. It is a remarkably well researched book and has several pages of Footnote References which reveal how thoroughly the author has delved into books and magazine articles.

May I wish our readers a very happy summer break, and I hope they can incorporate at least one "steamy day" into their travels.

Bas

TIMETABLE

FORTHCOMING MEETINGS & EXCURSIONS



All meetings are held at the British Legion, Station Approach, Marlow at 7.45 for 8.00 pm.

Sun. 10th July TRIP TO FOREST OF DEAN

Still seats available for our annual summer excursion, leaving Marlow at 09.00. Adults £7.50 children £4.00. Full details in last issue. Bookings please to Peter Robins, 95 Broom Hill, Cookham, SL6 9LJ. Tel. B.E. 27870.

Thur. 21st July RAILWAYS IN NORTH AMERICA - Eddie Lewcock

Eddie, one of our own members, relates a recent visit to the western USA and Canada.

Thur. 18th Aug. SNOW HILL & DOCKLANDS VISIT

The full itinerary is given within. If you wish to participate please be at the "Meeting Point" on The Lawn at Paddington at 7.00 pm prompt with a one-day CapitalCard.

Thur. 15th Sept. ANNUAL VIDEO SHOW

Brought forward this year, as Ron White of Colour Rail is coming in December. If any member has any VHS material to show please contact Mike Norris or Mike Walker as soon as possible.

Thur. 20th Oct. QUIZ NIGHT

We are taking on the Slough-Windsor Railway Society in a railway knowledge quiz. If you would like to be a member of the team please contact Martin Pink (Penn 6306) or Peter Robins.

Thur. 17th Nov. FFESTINIOG RAILWAY - Keith Catchpole

Keith brings us up to date with developments on Britain's principal narrow gauge railway.

SOCIETY NEWS

NEW MEMBERS

Once again we are delighted to welcome three new members to the Society, Reginald Morris, and father and son, Ian and Sam Berrido all from Marlow.

PREVIOUS MEETINGS

The Society is now firmly established in its new home at the British Legion which seems universally popular. It is intended that we shall normally meet in the smaller bar unless we have some special event. Our apologies for the spartan floor covering during the May meeting, but the carpet was destroyed by flooding during a recent storm.

Mike Hanscomb was in fine form in March describing the lessons to be learned when things do not go as planned. Bravely, he even admitted to his own shortcomings, whilst working on the SVR.

Trevor Radway related the history of the Severn & Wye Joint Railway and the plans of the Dean Forest Railway at the April meeting, whetting members appetites for the visit on July 10th.

The May meeting was a film show presented by Paul Smith and Don Currie. Subjects included The Elizabethan, Coronation Scot, Flying Scotsman, King George V, American Fast Freight, The Marlow Donkey, Fawley Museum and a day in the life of Reading General station.

MEMBERS NEWS

Stan Verinder has written to tell us that he has been successful in his application to enter Sussex University as a mature undergraduate this coming Autumn. We all wish him luck. At present he is in training with an Open University course.

Interestingly Stanrecalls the British Legion was considered when the Society was formed in 1977 but was rejected although he cannot remember why. Perhaps one of our founders may be able to shed light?

Mark Hopwood has been elected meetings secretary of the Marlow/Maidenhead Passengers Association and recently spent sometime observing the activities of BR management at Reading as part of his GCSE studies.

SNOW HILL-DOCKLANDS VISIT

The evening trip on Thurs 18th August provides an opportunity to explore two of the most significant developments in the capital's rail network in recent years, The Thames Link services through Snow Hill Tunnel and the Docklands' Light Railway.

Meeting at Paddington at 19.00 we will use the Circle Line to Kings Cross where we board a 319 for the journey to London Bridge where a change is made before continuing to New Cross. London's oldest Thames rail tunnel is then traversed by an East London line train to Shadwell to reach the Docklands. A tour of the entire DLR will end at Stratford. A short emu run to Liverpool St and run round the Circle to Paddington concludes the tour.

All this is covered by a one day CapitalCard which can be purchased from your local station for slightly more than a day return. Members wishing to participate should give their names to Peter Robins.

QUIZ NIGHT

As you will see in Timetable the October meeting represents a new departure as we have challenged the Slough-Windsor Railway Society to an inter-club railway knowledge quiz. This will involve teams from both clubs answering questions on a variety of rail related subjects - many involving slides or videos as the basis of the question. We are looking to field a strong team and if you would like to be considered please contact Peter Robins or Martin Pink. Failing that come along and give the 'home' side plenty of moral support.

MATERIAL WANTED

There has been a notable drop in the number of contributions received by your Editor for publication. Therefore your Editor's bye-line is appearing far too frequently in these pages, something which I dislike as much as you probably. Please submit material so we can hear from as many members as possible. Meantime, many thanks to those who have taken the trouble.

RAILWAY ROUNDABOUT

NOTES AND NEWS

NETWORK TURBO 165

Tenders for the supply of the class 165 trains for WR local services have to be in by the end of June, the order being placed in September. To be marketed as "Network Turbo" rather than Sprinter, each of the 180 cars will be 23m long and seat 100 passengers. Features will include double plug doors, pressure ventilation, air suspension, 90 mph performance, Cummins engines with hydraulic transmissions and Westcode braking. General styling will probably resemble the forthcoming SR "Networker" emu's. Deliveries begin in October 1989, public service commencing in May 1990 on the Chiltern lines, the Thames Valley services following in October 1990.

JOINT LINE STEAM

Forthcoming dates for steam operation on the Joint Line are as follows:-

BR: Marylebone-Stratford-Marylebone : Sundays 17 July, 14 Aug, 11 Sept, 2 & 16 Oct.

Specials:

Sat 18 June	35028	Marylebone-Sheffield-Marylebone
Sat 25 June	4472	Marylebone-Derby
Sun 26 June	4472	Derby-Marylebone
Sat 3 Sept	6201	Birmingham-Marylebone-Birmingham
Sat 17 Sept	6201	Marylebone-Birmingham

The appearance of LMS pacific 6201 "Princess Elizabeth" is noteworthy and welcome.

SEEING RED

Two of the most familiar, if unremarked, cars on the WR have taken on a new look. Single unit parcels cars W55991/55992 have recently been overhauled, stripped of asbestos insulation and repainted in Post Office red livery. Built by GRCW in 1959 to replace GW cars 17 and 34, they provide an intensive shuttle service between Reading and Paddington and whilst being overhauled the class 116's (see the last Donkey) were pressed into service to replace them as well as being used in passenger service.

In the long term, consideration is being given to rebuilding the class 128 cars with Cummins engines and Voith transmission as on the Sprinters.

WINDSOR DOO

The Slough to Windsor branch got itself an entry in the record books on 14th March 1988 when it became the first passenger service to be converted to Driver Only Operation (DOO) using conventional swing door stock. All previous conversions involve new generation sliding door stock. The short 7 minute journey and staffing at both termini have allowed this experiment. So far no problems have arisen except on the first day Reading rostered a guard!

FURZE PLATT

Rebuilding of Furze Platt platform was completed around Easter. Devoid of any shelter and with only a simple railing it is thought to be as vandalproof as possible. Unfortunately the design is such that it is claimed it will not be possible to run ex-GW outside cylinder steam locos in future.

Many local stations are now receiving the latest pattern NSE platform seats in place of the long serving GW design.

NEW SIGNS

A new design of speed limit is much in evidence locally, replacing the familiar cut-out numerals. The new style is based on the highway sign and features black figures on a reflective white ground with circular red border. In many cases different speeds are shown for freight and passenger, whilst limits at crossovers or junctions have the addition of an arrow.

A second new trackside sign is appearing, lozenge shaped and bearing a number such as "091". This indicates radio areas to locomotive crews. More and more locomotives are being equipped with two-way radio as will the WR "Sprinters".

MARLOW DISTANT GOES

Speaking of signs, the last semaphore signal on the branch, the Marlow fixed distant, was removed around April 8th and replaced by a square reflective sign bearing a pictorial representation of a distant arm.

TIME TABLE NOTES

The Sunday "Donkey" service is operating for a shorter season this year, May 29th to September 11th inclusive, the shoulder

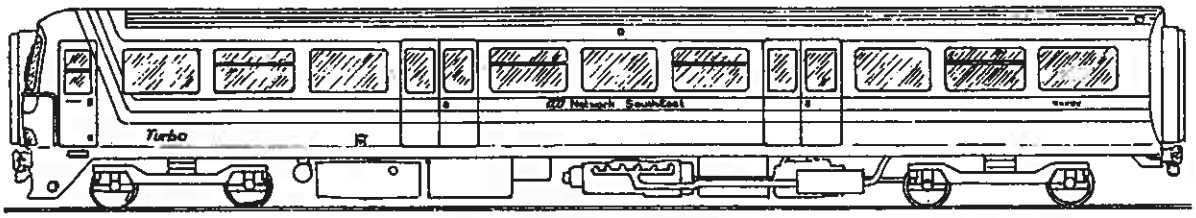
season continuing until the winter service commencement in October having been unsuccessful.
The new timetable includes the fastest ever journey from Paddington to Marlow, just 49 minutes, which involves the 17.02 from Paddington and a change at Maidenhead. The previous best time was 50 minutes by through train in June 1909! However, there has also been a reduction in the evening peak hour frequency on the branch.

There is also a new 09.13 Bourne End to Paddington designed to replace the withdrawn off peak X54 Londonlink bus service which was popular with shoppers and day trippers. But note how BR schedule the departure BEFORE the 09.30 threshold for off peak and Capitalcard tickets, or is the 09.13 wxempt?

YEOMAN JUMBO?

Foster Yeoman have ordered a fifth class 59 for delivery early in 1989 to handle expanding traffic. It will be identical to the first four in spite of the official EMD line that the 645 engine has been superceeded by the larger 710. With the current run down of La Grange prior to closure, the frame of 59.005 will be fabricated by GM in Canada.

When delivered Yeoman are contemplating double heading 8,900 ton 90 car trains between Merehead and Acton. If run these will be the heaviest trains in the world outside Australia and North America. At nearly 7/8th mile long, BR insist they run at night to avoid clogging up the WR passenger service.



Class 165 NETWORK TURBO Diesel-Hydraulic Multiple Unit

TWENTY-FIVE YEARS AGO

Roger Bowen

After the announcement earlier in 1963 of the Beeching Report one can only imagine an anti-climax for the summer.

The main locomotive news indeed referred to export deliveries rather than deliveries to British Railways. This was the despatch of the first of eight "Zambesi" class 1,200 hp locomotives built by Assooiated Electrical Industries Ltd for the Nyassaland Railways. These Co-Co locomotives were fitted with Salzer engines.

A more novel production for the domestic market was a prototype plastic bodied coach delivered from Eastleigh Works of the Southern Region. This was a conventional suburban type non-corridor coach built of moulded reinforced plastic. The coach No. D570200 entered service on the special Brighton to Lancing Works train for staff of the Carriage Works there.

News of the decline of steam is recorded in the withdrawal of 60022 "Mallard" and 46220 "Coronation", and the closure on 17th June of "Top Shed" at Kings Cross after more than a century as a steam depot.

The new era is recorded in new marshalling yards. On 4th June a new £5 million yard at Carlisle Kingmoor opened and previously on 21st May Tees marshalling yard on the North Eastern Region opened at a cost of £3½ million. More reconstruction is recorded with the commencement of a £3 million scheme to rebuild the Grosvenor Bridge across the Thames outside Victoria Station.

Two interesting special trains were run on 15th September. The first called the "Scottish Belle" ran from Victoria to Sheffield Park double headed by restored Caledonian Railway 4-2-2 No.123 and LSWR T9 class 4-4-0 No.120. The other was a special last "Castle" hauled express between Worcester and Paddington on a schedule of 2 hours 10 minutes.

The London Midland electrification continued southwards, from 31st August power was extended southwards from Stafford to Litchfield Trent Valley.

On 8th August more than £2½ million was stolen from the T.P.O. "Up Special" from Aberdeen and Glasgow to Euston was "held up" between Cheddington and Leighton Buzzard.

Inevitably closures feature in this article. On 17th June passenger services were withdrawn between Boston and Woodhall Junction, Eastern Region. From the same date the London Midland Region withdrew services between Redditch and Ashchurch.

A mixed bag of news for the summer of 1963, reflecting the great changes that were taking place on the railways.

TEN YEARS AGO

Roger Bowen

From our archives - Marlow Donkey No.7 June 1978.

The first article in the "Marlow Donkey" was a report on the installation of the Norman Aston Smith Memorial Seat at Bourne End station on 1st June by Ken Riley, Divisional Passenger Manager.

There was a list of BR excursions from High Wycombe, £3.80 to Torquay, £3.90 to York for example.

The reports on recent meetings listed April as an enthusiastic talk by A.P. Tomkins on the Leighton Buzzard Narrow Gauge Railway, and May Mike Halls on London Transport Railways. Visits had taken place in April to the Willesden Traction Maintenance Depot and May to Amersham Signal Box. The latter was the subject of an interesting article by Roger Woodham on the uniqueness of the box mixing LT and BR practices.

A long article was included on "Steam in Poland" by A.K. Palmer, an interesting article on one of Europes last steam strongholds. The last two articles were on visits, Steve Lewis on an excursion that 17 members travelled on to York in March, and Roger Bowen on the visit to Willesden TMD. Well-known member Mike Hanscombe featured in both articles.

One can see that only ust over a year of our Society it was a very busy and interesting one.

THE NEW GWR

RON BROOKS reports from deepest Gloucestershire

I have been asked, on several occasions, to write a piece on the GWR, close to all your hearts, and I cannot begin at a better place than my back garden.

We had not been very long at Greet when my wife detected signs of activity in the disused cutting that runs behind the house. I agreed, with great astonishment, that sundry persons were undoubtedly laying track and that I wouldn't be surprised to see some rolling stock eventually. It wasn't long before a very fine platform was built and in August '87 the Mayor and Brass Band welcomed the first train from Toddington.

The track has now progressed towards Cheltenham as far as Greet Tunnel (693 yds) which, the 'Winchcombe Shopper' assures me, it is hoped to relay with track for April '88. It cannot be a coincidence that a very fine hostelry is to be found adjacent to the Gretton end of the Tunnel. Come to think of it there is also a fine hostelry at the Greet end. Thirsty work shifting 370,000 cu.yds of spoil in the early 1900's.

The platform, my spies tell me, will eventually be graced with a real station building. What, I hear you cry, has all this drivel to do with the GWR? Well, the Gloucestershire and Warwickshire Railway are busy restoring part of the old Cheltenham to Honeybourne line and is well worth a visit. A ride (some 6 miles return) includes a view of the BACK OF RON's HOUSE! at no extra charge - and very few restored railways can make a claim like that. I'll keep you posted.

BOOKSHELF

Ron Brooks

As Shakespeare said "-summer's lease hath all too short a date" So it would be as well to get out and about to see some restored steam puffing about its business. This will only leave the odd late hour, or perhaps a lazy afternoon in the garden, for books. This time we look at books that could easily start off day dreams regarding modelling, the narrow gauge (go and see it) and how the wicked ogre diesel triumphed over the good fairy steam.

LMSR Locomotives to Scale — Bradford Barton
ISBN 0 85153 399X

Some fifteen LMSR loco drawings are provided together with an interesting short text for each one. There are also occasional extras, for example a cut away drawing of the interior of a tender. Even if you don't dream about making that model engine the diagrams and text are well worth a look.

19th Century Railway Drawings — David & Charles
Alan Prior — ISBN 0 7513 8006 0

This volume contains a hundred or so drawings of early railway equipment both broad and standard gauges. Starting from scratch is never easy and these diagrams show how the railways evolved their rolling stock and other equipment towards the highly efficient and reliable mechanical equipment of the 1900's. Why not get cracking on a Crampton (2+2+2)2-0? No? well the information conveyed by the excellent drawings cannot fail to both entertain (for the summer) and instruct (for later).

New Developments in Railway Modelling — A & C Black
Wagons & Coaches — Modelcraft

These are two tatty volumes full of nostalgia being written in the 1940's before plastic sheet ousted card or brass and before the sabotage of steam haulage. The first claim to contain "Recent tendencies, new designs and useful guidance". Time has caught up with the first two items, but the third is as good today as ever it was. The book is full of information for modellers and others. It quotes "Madderport" occasionally and, by a minor miracle, Madderport still survives at Pendon. The second book on wagons and coaches is only interesting as a record for techniques long overtaken by new plastics, new glues, new attitudes even. The first for enjoyment - the second for history.

Narrow Gauge Railways of the British Isles — David & Charles
P.B. Whitehouse & J.B. Snell — ISBN 0 7153 8523 2

Another winner from the old firm. The book is a pleasure to handle with superb pictures and illustrations, clear maps, most enjoyable and informative text. This book requires a comfortable chair and the opportunity for a long browse. Dreaming is not enough however some of these lines are still with us so what about an expedition?

Transition from Steam — Ian Allen
Col. H C B Rogers OBE — ISBN 0 7110 1014 5

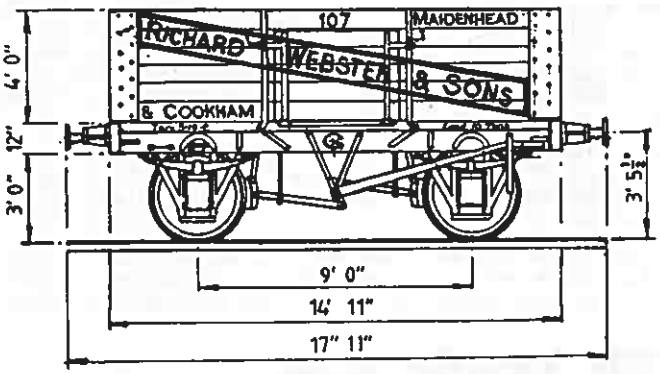
This book is packed with information and black and white photos. It covers its stated ground and more. I am still puzzled as to how the diesels were continued with when the early trials are considered. There must be something I missed that showed when they became good enough for the job. Now if steam had been thrown overboard for electric traction there could have been little to complain about from a technical, if not aesthetic, viewpoint. A good read and one for the shelf and later reference

THAMES VALLEY P.O. WAGONS

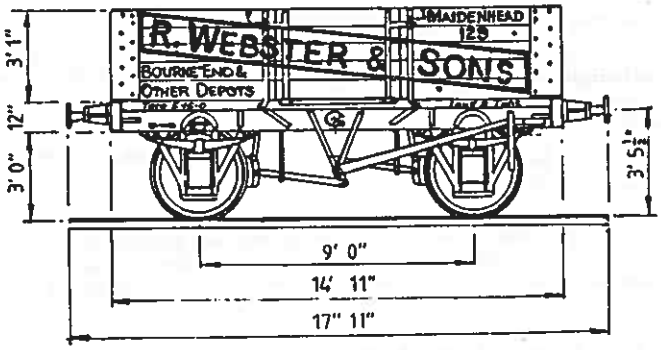
One aspect of the research for the Marlow layout has been the discovery of painting details of many private Owner wagons used in this area prior to nationalisation. In this occasional series, several will be illustrated, and, who knows, it may inspire Fawley to recreate this era on one of theirs. This first offering was requested by David Gardner.

Richard Webster & Sons were an old established firm based in Maidenhead. Although not seen in Marlow their wagons were a familiar sight at Bourne End, Cookham and Maidenhead.

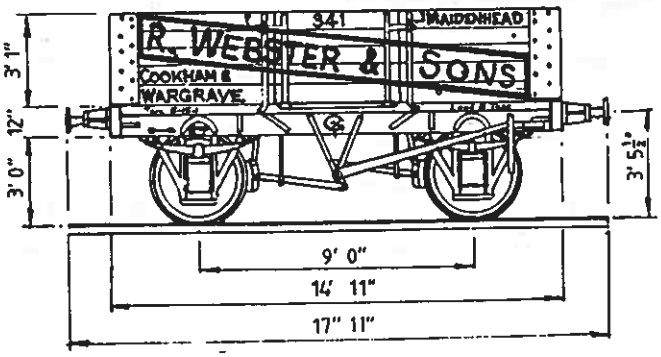
107 was a 10 ton 6 plank wagon built in Feb 1904 by Gloucester RC & W. It was painted dark red with black corner plates and strapping whilst the diagonal 'box' was white with all lettering white shaded black. Tare 5-18-2, single side brake, 4S axleboxes.



129, an 8 ton 5 plank from GRC & W in June 1911. This was chocolate (LSWR/SR brown) with a diagonal red box outlined in white. Again all corner plates and strapping were black, lettering white shaded black. Tare 5-16-0, single side brake, 4S axleboxes



341 identical to 129, but built in Sept 1907, with identical livery except for inscriptions. Tare 5-16-1, single side brake, 4S axleboxes. 323 and 325, July 1906, were similarly lettered identical vehicles with tare weights of 5-11-3 and 5-11-4 respectively.

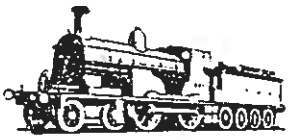


All these wagons can be produced using Slaters 6 plank GRC & W side door wagon kit, cut down for the 5 plankers. In the thirties Websters appear to have received new 5 plank 10 ton opens to the 1923 RCH spec. These were lettered as above but the body colour changed to red oxide, running numbers are unknown.

LOCO PROFILE

GRESLEY'S A4

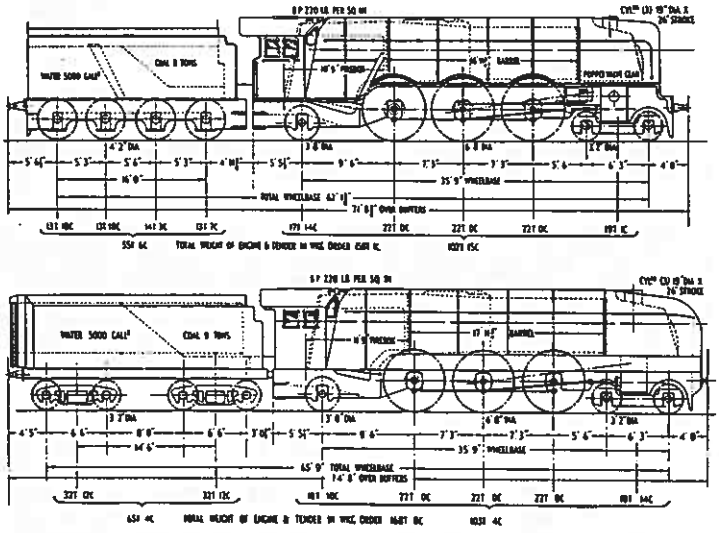
Mike Walker



Members will need little reminding that this summer sees the 50th Anniversary of "Mallard's" epic dash down Stoke Bank on 3rd July 1938, which although billed as a brake test became, under the direction of Sir Nigel Gresley and in the hands of Driver Duddington and Fireman Bray, a world speed record run with a maximum of 126 mph, breaking by 2 mph the record held by the German State Railways.

It was events in Germany which indirectly brought about the A4's. The LNER directors had cast envious glances at the high speed "Flying Hamburger" diesel trains introduced in 1933 and sought to use similar equipment for a high speed London-Newcastle service planned for 1935 to mark the Silver Jubilee of King George V. However studies showed the best time would be 4¼ hours with limited passenger accommodation and comfort whilst trials proved that, given a clear road and following wind, an A3 pacific could make the journey in 4 hours with seven carriages.

Gresley resolved that to make such a schedule possible on a daily basis an extra reserve of power was called for. So work commenced on a new design based on the proven A1/A3 pattern, but with the addition of streamlining. Several alternative designs were considered, two of the reject schemes being shown. These developed the curious front ends previously seen on the experimental W1 4-6-4 and P2 2-8-2 locomotives. Unfortunately such designs had fallen short of the desired smoke lifting ability, important with the somewhat soft exhaust of Gresley's designs. The answer lay in France. During a visit in 1933 Gresley had been impressed by some shovel nosed railcars designed by Ettore Bugatti. With aid of a wind tunnel the now familiar shape of the A4 was honed into an efficient smoke lifter which reduced the power requirements of the locomotive and fuel consumption at speed.



Above: Schemes prepared in May 1934 (top) and March 1935 (bottom), during development of the Class A4 Pacific; showing a transition from a layout similar to the Class P2 2-8-2 as built, towards a more fully streamlined outer casing.

Beneath this casing the A4's were quite conventional. The boiler was developed from the A3 design but an increase in pressure of 30 psi and a greater degree of siperheat allowed the barrel length to be reduced by one foot whilst improving steam generation. The rear half of the boiler was slightly tapered and carried Gresley's banjo style dome covering a slotted steam collector designed to reduce priming. A typical LNER wide round topped Wootton firebox was provided, ideally suited to the calorific characteristics of the Yorkshire coal usually burnt. At the opposite end, the smokebox had a sharply sloping top but otherwise was quite conventional. Incidentally, access to the smokebox door was by a pair of clamshell doors in the nose opened by inserting a key in the side of the loco. Yes - you really could see an A4 being wound up!

Streamlining was not confined to the exterior. Drawing on the work of the great French engineer Andre Chapelon, Gresley streamlined all inside steam passages and ports which helped to make the A4's extremely free steaming locomotives, although as built, single chimnies were used.

As with all Gresley's large engines there were three cylinders in this case 18½" x 26". The outside ones were mounted between the bogie axles with 8" piston valves above operated by sets of Walschaerts gear. The inside cylinder was above the trailing bogie axle, steeply inclined at 1 in 8 and with its piston valve alongside. No inside Walschaerts gear was provided, instead the inside cylinder valves were actuated by a system of rocking levers connected to the tailrods in front of the outside cylinders. These were of unequal length and provided a 2:1 motion. Known as Conjugating Gear it is usually attributed to Gresley, but the detail design was worked out by Harry Holcroft, a former GW draughtsman whilst working for the SECR. On the A4 the valves were set for 65% maximum cut-off with long travel - a lesson learned from the LNER trials of a GW Castle in 1925.

The formal order for the first four was placed late in March 1935 leaving Doncaster just 25 weeks to prepare detail drawings and build, but everyone rose to the challenge and the first rolled out on schedule at the beginning of September. Nothing quite like it had been seen in Britain before, railway conservatives were appalled but public imagination was captured. Painted two tone silver-grey to match the Silver Jubilee articulated trainsets, they were numbered 2509-2512 and named Silver Link, Quicksilver, Silver King and Silver Fox. Trials soon proved their abilities and in a press demonstration before entering service Silver Link reached 112.5 mph.

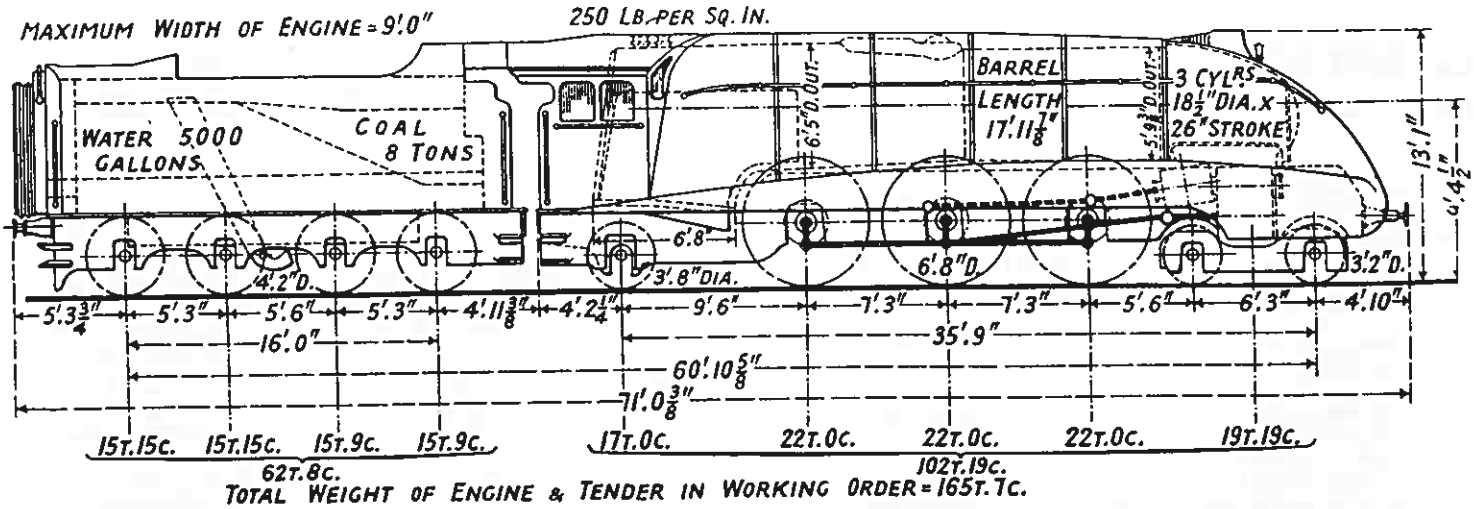
Once in service little modification was required apart from a subtle change to the bulbous nose. This followed an accident at Kings Cross when a shunter was crushed due to the lack of clearance given by the original short buffers. A further batch of 17 were ordered for building in 1936/37 and numbered 4482-4498. These were virtually identical to the previous batch but for livery. 4482-4487/4493/4494 emerged in standard apple green, some with the entire smokebox black which ill became them. With the planned introduction of further streamliners, the "Coronation" and "West Riding Limited" in 1937, the remainder appeared in the now familiar Garter Blue scheme set off by dark red wheels and stainless steel lettering. This was later adopted as standard for the entire class although some of them had transfer lettering.

With the inauguration of the "Coronation", A4's were required to commence non-stop running between London and Edinburgh. For this reason several of the class received corridor tenders, initially removed from A1/A3 pacifics and fitted with additional fairings whilst later corridor tenders were built new. The locos equipped varied and always formed a minority of the class.

The third and final batch appeared in 1937/38 numbered 4499/4500/4462-4469/4900-4903 giving a total of 35 locomotives. Again little change affected these locos except 4468/4901-4903 which received Kylchap double chimneys, another Chapelon advance which made them even more free running - it was no coincidence that one of these was "Mallard". Gresley intended retrofitting the rest of the class, but this and a super-A4 proposal with a 275 psi boiler and 39,040 lbs TE were cancelled by the war.

World War II had a profound effect on the class. Gone were the prestige high-speed streamliners, instead they were called upon to handle trains of 700-800 tons and suffer from reduced maintenance. The eye catching blue was replaced first by utility black and then by a thick coat of grime. The reduction in maintenance standards highlighted the weakness in design. The middle big end had always suffered from having too small a bearing area and regularly ran hot or worse ("Mallard" suffered this fate during its record attempt and was unable to return in triumph to Kings Cross). Wear in the conjugating gear caused valve overtravel leading to adverse performance. Edward Thompson, who replaced Gresley as CME in 1941, seriously considered rebuilding the class with three independent sets of Walschaerts gear and no streamlining but in the event confined himself to having the side valences removed to improve access. In the event, the worst effect of the war on the class was a direct hit by a German bomb on York shed on 29th April 1942 which destroyed 4469 "Sir Ralph Wedgewood" (formerly "Gadwall"), although the tender was salvaged.

As built the majority of A4's were named after British birds. In addition to the first four other odd names included 4488 "Union of South Africa", 4489 "Dominion of Canada", 4490 "Empire of India", 4491 "Commonwealth of Australia" and 4492 "Dominion of New Zealand". Of these 4488/4489 and 4492 carried locomotive whistles from the SAR, CPR and NZGR respectively in place of the usual Gresley chime, additionally 4489 had a CPR loco bell ahead of the chimney. For the "West Riding Limited" 4495/4496 were named "Golden Fleece" and "Golden Shuttle" reflecting the regions textile trade, whilst, as the 100th Gresley Pacific, 4498 was named after its designer. Just prior to the war a start was made on renaming seven engines after LNER directors and in 9/45 4496 became "Dwight D Eisenhower" and the first restored to blue. The LNER's chaotic numbering was taken in hand in 1946 and originally the A4's were to become 580-613 in build order, but only a few were treated before the class became 1-34 in a somewhat random fashion. Under BR 60000 was added to their final LNER numbers.



After nationalisation, Doncaster got to grips with restoring the class to pre-war standards, 22 "Mallard" and 60034 "Lord Farringdon" represented the class in the 1948 Interchange Trials. The class wore both BR's experimental blue liveries before the decision to paint all principal express locos in Brunswick Green, which if anything suited them less than the short lived LNER green.

The inauguration of the "Elizabethan" in 1953 restored non-stop running between London and Edinburgh and brought with it the second great age of the A4's. There maximum cutoff was increased to 75% to improve starting with heavy loads and finally in 1957/58 the entire class received Kylchap double chimneys.

By now the writing was on the wall, the first English Electric Type 4's (class 40) arrived on the ER in 1958 and although the A4's could match their performance, a further threat arrived at 'The Cross' in 1959, a big blue diesel called "Deltic". The twenty-two production examples which arrived in 1962/63 displaced the A4's (and other LNE Pacifics) from their prestige jobs. However, unlike the Stanier Pacifics and GW Kings which vanished quickly, a number of A4's moved north to Scotland where they went to work on the Glasgow-Aberdeen expresses over the old Caledonian where they were highly thought of. But this swansong was brief and the withdrawal of 60019 "Bittern" and 60024 "Kingfisher" brought the curtain down on this famous class in 1966.

Six were saved from the scrappers torch, 60008 "Dwight D Eisenhower" and 60010 "Dominion of Canada" emigrated for display in North America, 60009 "Union of South Africa", 4468 (60022) "Mallard" and 4498 (60007) "Sir Nigel Gresley" are restored to working order whilst 60019 "Bittern" after years of neglect is about to emerge cosmetically restored as the pioneer 2509 "Silver Link".

RAILS TO JUNGFRAUJOCH

Mike Walker

The town of Interlaken nestling between lakes Thun and Brienz and surrounded by the mighty peaks of the Swiss Alps has long been a popular destination for holidaymakers from all over Europe, whether seeaking winter sports excitement or merely wishing to enjoy the all year scenic beauty of this region known as the Bernese Oberland. To transport these visitors and the residents of the isolated Alpine communities the region has developed an impressive network of narrow gauge electric railways which reach to the roof of Europe. Opened by independent companies between 1890 and 1912 they are now under the common management of the Berner Oberland Bahn although constituent identities are retained.

Headquarters are at Interlaken Ost (East) station where the metre gauge BOB connects with the metre gauge Brunig line of the Swiss Federal Railways (SBB) and the standard gauge branch of the Berne-Lotschberg-Simplon from Spiez. During the summer green sbb through coaches can often be seen amid the brown and cream BOB trains, likewise BOB coaches make it to Lucerne.

Leaving Interlaken BOB trains tend to be quite hefty and are hauled by one of the 1368hp motor coaches, a second being buried halfway along. The train swings south crossing the wide valley of the River Aare and, after skirting the local airfield, heads for a deep side valley which frames the snow capped peaks of the high Alps. As the valley is entered comes the first station, Wilderswil, actually a suburb of Interlaken.

Here a change may be made to the 80cm gauge Schynige Platte Bahn, whose veteran red and cream 0-4-0 boxcabs push their trains up the 4.5 mile, 1 in 4 line to Schnige Platt a well known vantage point to the east, 6,450' above sea level.

Meanwhile the BOB has continued into the depths of the Lutschine gorge, where cliffs tower more than 1500ft above the train, to reach Zweilutschinen, 3¾ miles from Interlaken. Here valley, river and railway all fork and most BOB trains divide (or combine) at the attractive chalet station, hence the mid-train motor coach on leaving Interlaken. Taking the right hand fork the BOB heads due south into the even narrower ravine of the White Lutschine Valley. Until now the line has been adhesion worked but soon after leaving the junction the train slows to engage the first of two rack sections as the grade steepens to 1 in 11. The second rack section ends as the track levels out into Lauterbrunnen station, 7.5/8th miles from Interlaken.

Lauterbrunnen is a thriving community squeezed into the floor beneath the towering cliffs from which tumble the spectacular Staubbach Falls in a free fall of some 1500ft and, from certain angles, appearing to land directly on the roofs of the town. Although Lauterbrunnen is the terminal of the BOB, the group provides two alternative onward journies, a second rack railway or, across the road, a steep (1 in 1½) funicular almost a mile in length up the west face of the ravine.

At the summit, Grutschalp, a metre gauge motor coach of the Bergbahn, Lauterbrunnen, Murren waits to convey passengers along the 3½ mile tramway through the high alpine meadows, across the head of the Staubbach Falls, to Murren. Its clifftop position precludes road access so the village of Murren is a totally unspoilt collection of Swiss chalets whose window boxes are a riot of colour in summer. At the opposite end of this fairytale community the BOB operates another shorter funicular up to a nearby peak the Allmendhubel, which really only comes into its own in the winter sports season.

More spectacular is the Schilthornbahn a four section cable car system which climbs no less than 6869ft in a length of 4¼ miles and opened in 1967. Murren is the mid-point, above two sections each with 80 passenger cabins climb to Birg and the top of the Schilthorn, 9740ft above sea level. Below Murren two 100 passenger cars descend through Grimmelwald to Stechelberg at the head of the White Lutschine Valley. From here a Swiss Post Bus provides a service back to Lauterbrunnen.

The second BOB route out of Lauterbrunnen is the 80cm rack and pinion Wengemalpbahn (WAB) whose green and cream trains make a cross platform transfer with the BOB. Formed of a driving trailer with a motor coach pushing, the WAB trains leave the station and immediately start a 1 in 5½ climb and turn through 180° to attack the east wall of the valley giving a panoramic view of the village. Presently the line splits, the original 1893 line diverges to the right and climbs at 1 in 4 but is used only by freight trains and descending passenger trains. Ascending trains take the left, new, line opened in 1910 and, after a further curve and tunnel, arrive at Wengen rejoining the old line just before the station.

Like Murren, Wengen is inaccessible by road but is a larger community with several hotels. Indeed in the winter and on summer evenings many trains terminate here. From here on the BOB group changes from being a vital means of transport for the locals to being an out and out tourist railway.

Leaving Wengen the scenery changes as the "tree line" is crossed and the mountains are covered in harsh grass. Suddenly as the train approaches Wengernalp station it takes a left hand curve round a bluff and the ground drops away to the right opening up one of the most spectacular views in Europe if not the world. Across the valley rise the barren rocks, mantled year round in snow and ice, of the Monch, Jungfrau and, to the left, the

Eiger, each presenting a total face of some 12,000ft to the passenger. The mountains command attention whilst the train completes its journey to Kleine Scheidegg at 6,762ft, having climbed 4,147ft in the 6,51 miles from Lauterbrunnen.

Kleine Scheidegg sits on a high alpine saddle between the mountains. The "community" consists of a couple of hotels and restaurants and two railway depots. Space is at such a premium that the WAB's turning wye burrows into the mountainside. The second railway here is the final member of the BOB group, the Jungfrau Bahn. Whilst its orange and cream trains look much like the rest of the group, the metre gauge JB is different using the Strub rack system rather than the Riggenbach used elsewhere and has a two wire 50Hz AC electrification originally at 500V but now 1125V where the rest of the BOB uses a 1500V DC system (525V on the BLM).

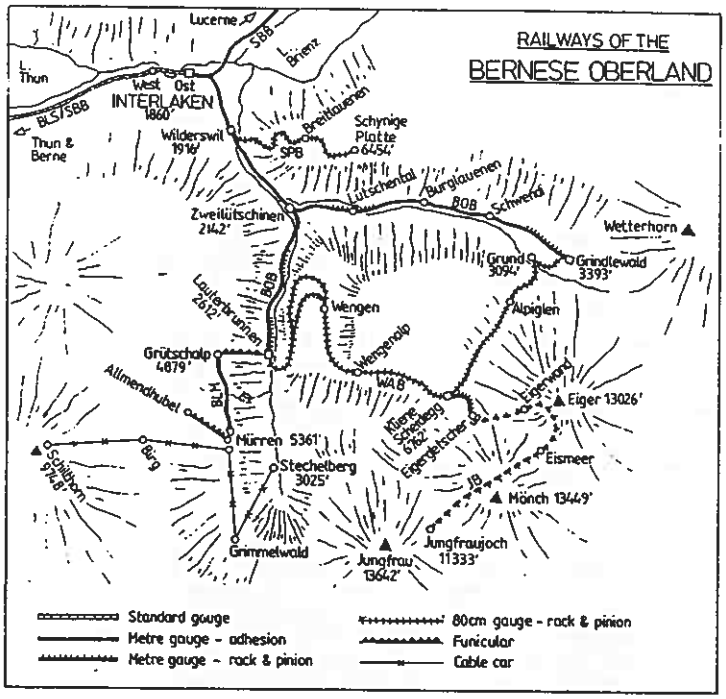
The JB's environment is unique taking tourists to a world otherwise inaccessible to all but the most experienced climber. Leaving Kleine Scheidegg the train turns south making for its first station. Eigergletscher, and then immediately enters a rock tunnel. A stop is made for 5 minutes at Eigerwand inside the mountain to enable passengers to look out of picture windows set into the precipitous north face of the Eiger with Grindlewald 6000ft below. A second stop at Eismeer allows viewing of the ice fields on the south side of the mountain.

Finally the train reaches its terminus, Jungfraujoch, still in the tunnel and at 11333ft the highest railway in Europe. The 5¾ mile line took 16 years to build, all but two for the 4½ mile tunnel section, opened in 1912. From the station, galleries lead to the restaurant and out onto the ice fields. A hotel once clung to the mountain but was destroyed by fire in 1972 - the local brigade couldn't get up there! Alternatively lifts take visitors to the Ice Palace (ice sculptures inside the mountain) or up to the Sphynx, a meteorological station on the saddle between the Jungfrau and Monch, 11723ft above sea level.

JB trains usually return non-stop to Kleine Scheidegg from where the BOB offers an alternative route back to Interlaken. The eastern extension of the WAB descends at nearly 1 in 4 across the north face of the Eiger, protected by extensive rock shelters, through Alpiglen to Grund. Here the train reverses and makes a short climb to the popular resort town of Grindlewald, overlooked by the peak of the Wetterhorn.

At Grindlewald it is again necessary to change trains and rejoin the metre gauge BOB train which, as at Lauterbrunnen, is a simple cross platform transfer although the BOB train appears to terminate in the town's main street.

Almost immediately after leaving Grindlewald, the BOB train engages in the first of two rack and pinion sections in the descent of the Black Lutschine Valley, which at nearly 7 miles is longer and wider than the White Lutschine. Intermediate stations



serve villages at Schwendi, Burglauenen and Lutschental. At the latter point comes the final rack section as the grade steepens to 1 in 8½.

Eventually the train rolls into Zweilutschinen and is combined with one from Lauterbrunnen for the final stage of the journey back to Interlaken bringing to a conclusion a day's exploration of some of the most spectacular railway and scenic sights to be found in Europe.

Whilst the entire group's normal operations are powered by electricity, two operational steam locomotives are retained for special events. No.5 is a 80cm gauge 0-4-2T with inclined boiler for rack working on the SPB. Built by SLM in 1894 it is reminiscent of the Snowdon locomotives even down to the green livery. No.11 is a larger metre gauge 2-6-0T built by SLM in 1902 and kept at Zweilutschinen when not in use. The JB retains one of its original electric units, clad in varnished teak and polished brass, for special work. This has the appearance of a small box cab loco and coach but closer inspection reveals the whole ensemble is on a common frame.

A BIT OVER THE TOP

Eddie Lewcock

It all started with a casual browse through that remarkable Victorian work - ripe for re-print - "Railway Machinery" by D.K. Clark, produced by Blackies in 1855.

On page 105 - "Relative Steam Pressures in Great Britain", Clark refers to Gooch's locomotive from the second series of famous Broad Gauge 4-2-2 machines and stated that Mr. Gooch's observations on the point were very remarkable, as the attached table shows.

'At the lower speeds, the pressure in the valve-chest is, as usual, lower than that in the boiler; but, as the speed increases, the former rises superior to the latter, under all the notches. This is contrary to all ordinary experience, though very accurate indicators were employed. Assuming the genuineness of the indications, which it is as difficult to doubt as to believe, the only apparent cause of the superior pressure in the valve-chest, is the high temperature in the smoke-box, which, operating on the steam as it passes through the pipe, close in front of the tubes, in the manner shown in the GWR Tank-Engine, figured in our plates, may evaporate any water associated with the steam, and even surcharge the latter, and raise its elasticity before it enters the valve-chest. We have had abundant evidence, at least, to show that perfectly dry steam moves through passages with much less effort than steam charged with water; and the Great Britain, with its capacious boiler and easy evaporation, has been found by Mr. Gooch, after repeated experiments, not to be sensibly affected with priming. The steam, therefore, before it leaves the boiler, is comparatively dry, and is further heated on its way to the chest; and we may warrantably conceive that the pressure in the chest may be at least sensibly equal to that in the boiler. Still the difficulty remains of conceiving that steam of lower pressure should flow towards higher-pressure steam; this, however, consistently

TABLE No. L — RELATIVE PRESSURES IN THE *GREAT BRITAIN*

No. of Diagram	Speed of Engine	Pressures indicated		
		in Cylinder	in Valve-chest	in Boiler
	mph	lbs.	lbs.	lbs.
	1st Notch. Admission 16 inches			
25	15	70	77	78
26	17	88	93	97
27	21	95	98	105
28	24	85	95	90
29	27	80	85	75
30	31	90	100	97
31	31	80	88	82
32	49	60	73	76
33	54	89	100	98
	3d Notch. Admission 11¼ inches			
34	17	88	95	100
35	18	70	77	77½
36	21	92	98	105
37	26	72	93	87
38	31	79	90	83
39	32	86	101	98
40	40	76	87	75
41	51	70	77	74
42	55	84	100	98
	5th Notch. Admission 7 inches			
43	17	89	97	105
44	18	70	77	77½
45	21	93	100	105
46	28	74	85	80
47	31	83	90	90
48	36	80	90	75
49	50	77	78	72
50	56	90	105	98
Means of the above	1st Notch,	82 lbs.	90 lbs.	89 lbs.
	3d Notch,	81 lbs.	91 lbs.	89 lbs.
	5th Notch,	82 lbs.	90 lbs.	88 lbs.

enough, takes place only under the higher temperatures which accompany higher speeds.'

There on the tabulation is the proof of part of the statement, as the pressures in the valve chest start out below boiler pressure as would be expected; only a little, mind you, which indicates a good passageway design; but then on diagrams 28, 29, 30, 31, 33, 37, 38, 39, 40, 41, 42, 46, 48, 49, 50, the valve chest pressure is higher than boiler pressure.

Now clearly Clark's explanation does not work, superheating does not increase the pressure nor does steam drying, which is all that Gooch's boilers could do. Were the Swindon engineers so dim as not to check their gauges? With a man like Gooch involved the answer is a positive NO.

Well then, there is a nice little historical dilemma; after all there are the writings of journeys on the footplates of modern locomotives fitted with steam chest gauges in which praise has been given to steam circuits in which the drop is only about 5 to 10 psi from boiler pressures. The Gresley A4's spring to mind.

So there the thought stayed lodged in the mind but not considered seriously - until -

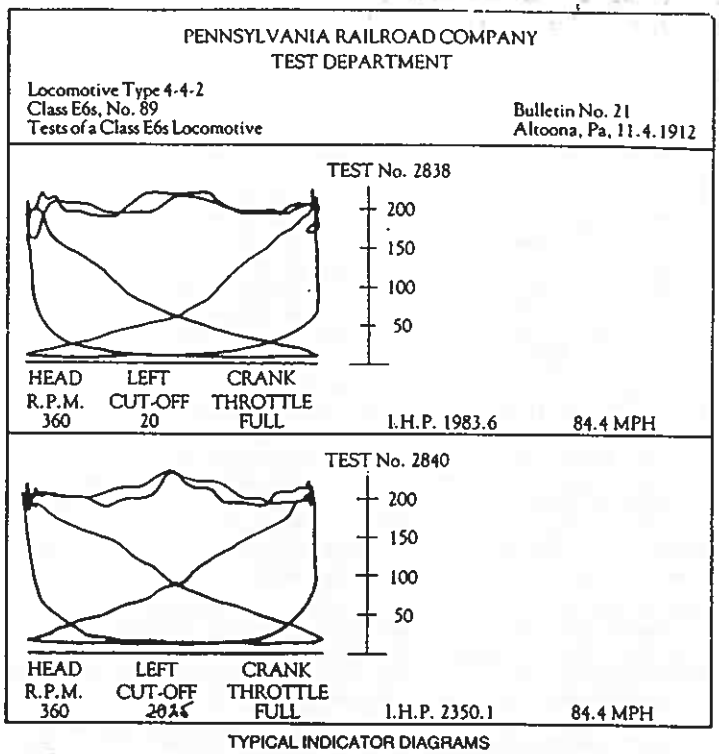
One night, some time later; the Pennsylvania Railroad Company Reports of Locomotive Tests were being perused, and in the course of time, the trials of the type E6s Atlantics were reached. Now these locomotives were probably one of the great Atlantic designs of the world and lacked nothing in power, having developed over 2350 ihp at 84.4 mph on trials. They were rather heavy on axle loading and the K4s Pacifics were developed out of them soon after and rapidly outshone them.

However, the E6s trials were through, and well recorded, being carried out in 1913, one year after building was started. At that time locomotive engineers were still convincing themselves that superheating paid off and the trials were therefore against the saturated E6 Class, in which of course the E6s won hands down.

However right in the middle of the report on page 83, section 105, there is the following statement:-

'One noteworthy feature of these diagrams is the variation in the steam-chest pressure, it being characteristic of high speed for the steam-chest pressure at mid-stroke to be noticeably higher than the admission pressure, also somewhat higher than any boiler programme recorded. This is more marked for Test 2840, the diagram taken from the left side of the engine at 84.4 miles per hour, the steam-chest pressure rising at mid-stroke to approximately 230 pounds, whereas there is no boiler pressure recorded higher than 206 pounds. This excessive pressure must be due to inertia, or dynamic action of the steam after cut-off. The sudden drop in steam-chest pressure at admission occurs in most instances, especially at high speeds, when compression is low'.

Well, there is a turn up for the books, a steam chest pressure over 10% higher than boiler pressure! The low compression pressure would assist the steam in the well designed steam pipe to get up to a high velocity and then with the sudden closure of the inlet valve after admission, the velocity energy, called the Kinetic energy, is suddenly transformed into Pressure energy so that the unbelievable occurs and the boiler pressure



TYPICAL INDICATOR DIAGRAMS
These diagrams are for speeds of 84 miles per hour.

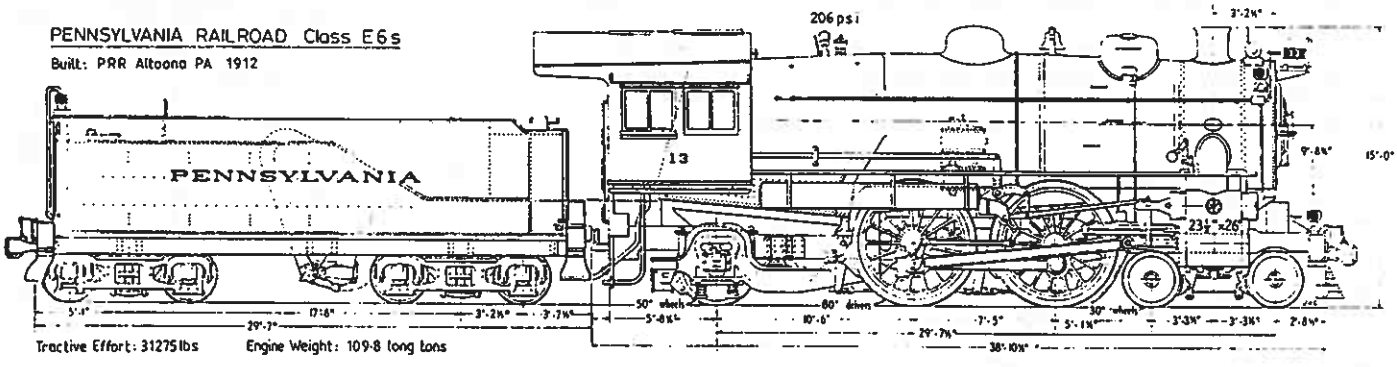
can be exceeded. This can be clearly seen from the attached indicator diagram for Test 2840.

After all, how else would steam injectors work? Invented about the time that Clark wrote his treatise they relied just on this principle of physics to enable them to work. A flow of steam or water can only occur with a higher pressure at one end of a pipe than the other - so how else can a boiler push water into itself if this law did not apply?

Mind you, it did not help the driver get more power out of the engine; for that you had sometimes to resort to the wiles of a practical man!

As a trainee, I found myself firing on LMS 4F going up from Rossley to the Peak with a full load on. We were stopped on the way up, to let an express through, and on the re-start the safety valves lifted, so I eased back. 'Don't knock off, keep them blowing' the driver shouted, so back I started and kept them at it. HE knew what the reason was! With valves lifted you got those few extra pounds per square inch in the boiler which in a tight situation on a steep bank, could make all the difference between keeping going and stalling! Well, that is where your practical experience comes in.

So there is another little railway curiosity aired!



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