



BRITISH DIESEL LOCOMOTIVES OF THE 1950s AND '60s

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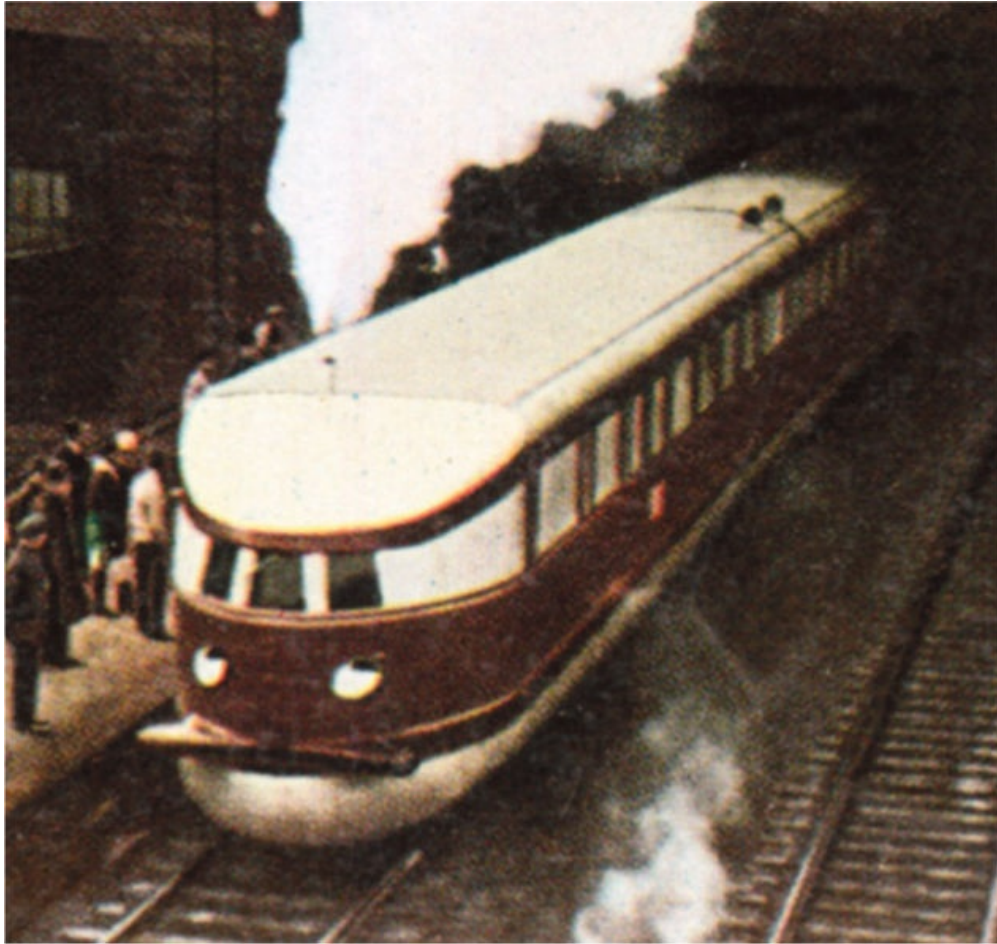
INTRODUCTION

I've seen some of these loco drivers climbing into a diesel as if it was the grave .

So said the narrator of the British Transport Films recruitment short *A Future on Rail* in 1957. Though the idea was to show the positive aspects of modernisation – ‘these drivers’ soon learn to enjoy the comforts of the cab after the toil and heat and sweat of the footplate – the truth was that many men left the industry for good when forced to leave steam behind. And why not? Steam engines *breathed* ; diesels were just ‘boxes on wheels’ – you got in, pushed a button and off you went. It just wasn’t the same. There just wasn’t the dignity – the *heroism* – in this brave new world. Not that it was all that new...



At Guildford in 1963, ex-Southern 'N' class no. 31870 waits while a porter takes a barrow of parcels up the platform – a world of tradition that would soon change for ever.



The German State Railway's SVT 877 – the 'Fliegender Hamburger' – was launched in 1933 and reached 100mph in service.

Invented in 1892, the diesel engine was first used to power a railway vehicle in 1912. Initial trials weren't terribly successful, but a breakthrough came two years later when American giant General Electric produced a reliable control system. By 1929, Newcastle-based Armstrong Whitworth was building diesel-electric locomotives for Argentina, but in 1933 the German State Railway launched SVT 877 – the 'Fliegender Hamburger' – a unit train that demonstrated the technology's true potential by reaching 100mph in service.



The elegant Art Deco lines of GWR railcar no. 4, built by AEC and introduced to traffic in 1934.

British railway companies were a little slower off the mark: the London Midland & Scottish had dipped a tentative toe in the water in 1927 with the production of a diesel railcar, but around the time the SVT 877 was taking off, another Armstrong Whitworth locomotive was being tested – to no great success – on the London & North Eastern. It and the Great Western would also experiment with diesel railcars, but while each of the ‘Big Four’ – the GW, LMS, LNER and Southern – would explore the possibilities of diesel shunters, steam remained dominant, and it was not until after the Second World War that engineers started to think more deeply about putting internal combustion engines to heavy main-line use.



This Armstrong Whitworth 800hp diesel-electric locomotive was tested on the LNER in 1933. In a 'diesel-electric', the engine is connected to a generator that creates the power to drive the traction motors.



An LMS diesel shunter working at Toton marshalling yard in July 1939.

As it turned out, only no. 10000 – a joint venture between the LMS and English Electric – emerged before nationalisation in 1948. Though British Railways had taken delivery of six further locomotives by the mid-1950s, the tide didn't fully turn from traditional forms of motive power until recruitment problems combined with BR's financial difficulties to make it inevitable. A 'Modernisation Plan', published at the end of 1954, would see orders for 174 diesels placed from the following November. No one knew then that by 1968 many would be on borrowed time as the industry entered the Inter-City age and increasing competition from domestic airlines and road hauliers meant a growing need to fight for custom.



A portrait of the LMS's no. 10000, which featured a 1,600hp English Electric engine. It entered service in December 1947 – the month before the LMS became part of British Railways.

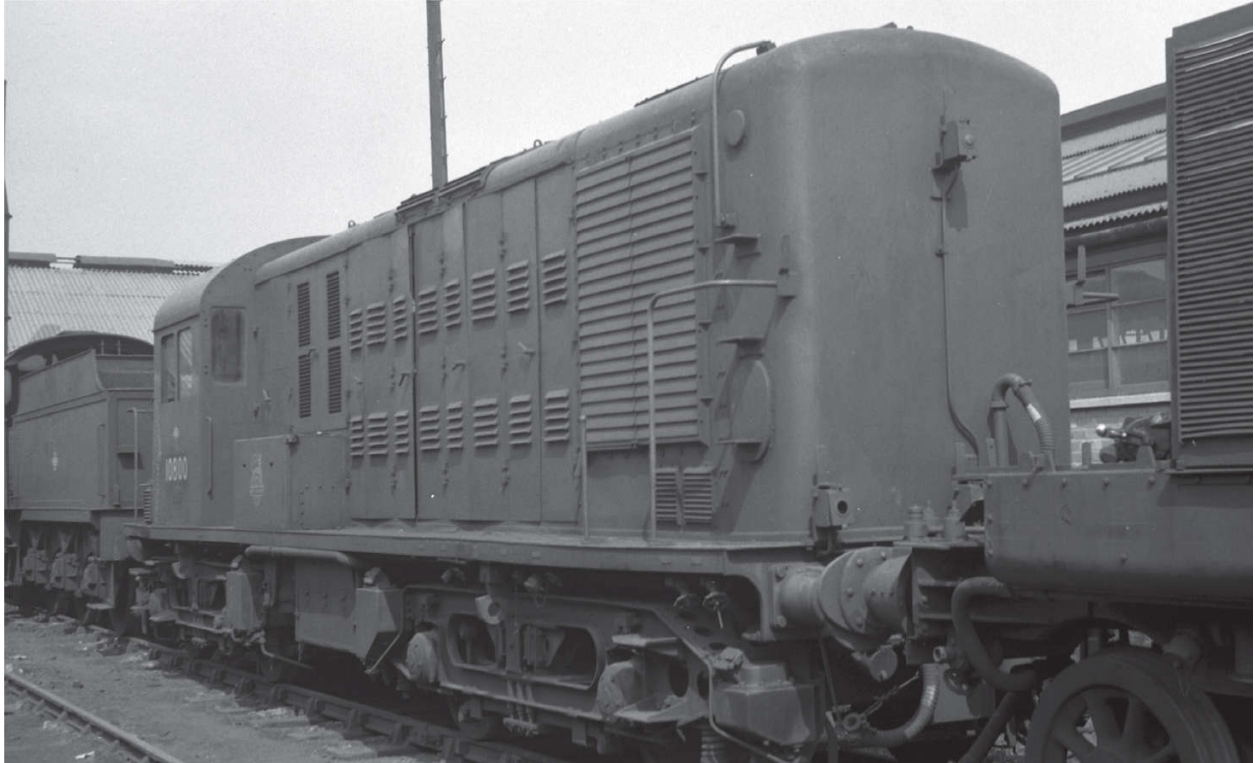
PLANNING FOR THE FUTURE

A well-dressed man arrives at The Kremlin, his polished shoes tapping deftly on the pavement. Not that we're in downtown Moscow, rather grey post-war London. Marylebone Road, to be precise...

The building – no. 222 – got its nickname from its labyrinthine passageways and corridors. First a hotel, then a hostel for trainmen, it's now the home of the Railway Executive (RE).



The GWR's experiments with gas turbine traction – illustrated by no. 18000 – indicate that the suitability of diesels for mainline use was not considered proven in the mid-1940s.



Ordered by the LMS, no. 10800 first appeared in 1950. Later rebuilt by Brush for testing purposes, it remained in active use until 1968.

The man – Robert Arthur Riddles – is the RE member for locomotive design and construction. Starting his career at Crewe Works in 1909, he went on to become Vice President of the London Midland & Scottish Railway. At the Ministry of Supply during the Second World War, he'd been responsible for the acquisition of motive power. He owes his current position to one thing: nationalisation.

The war had moved many deceptively ordinary people to find the strength for bravery and selflessness, but it also led to a desire for social change that would see a landslide Labour victory in the 1945 general election. Once in office, the party made good on its pre-election promise to take public services into public ownership. As a result, the 1947 Transport Act saw the nationalisation of the Great Western, London Midland & Scottish, London & North Eastern and Southern railways (along with fifty smaller companies) from 1 January 1948.

The system was divided into six regions (the Eastern, London Midland, North Eastern, Scottish, Southern, and Western), above which sat the RE, which in turn answered to the British Transport Commission (BTC). The BTC had been established to provide 'an efficient, adequate, economical and properly integrated system of public inland transport and port facilities within Great Britain for passengers and goods'. This meant that its first chairman,

professional civil servant Sir Cyril Hurcomb, oversaw executives that controlled not only the railway, but also bus companies, road hauliers, docks, hotels, canals, tramways, shipping lines, London Transport, and even a film unit.



Built to the same design as no. 10000, no. 10001 appeared just after nationalisation.

Trading as 'British Railways' (BR), the RE inherited over 20,000 locomotives, many of which had not aged well. Indeed, some of the tank engines in use on former Southern and LNER branches were in such bad shape that new LMS-designed locomotives had to be drafted in to cover the timetable. The LMS had also been behind another bequest: no. 10000, a 1,600hp diesel-electric, intended to haul express passenger services out of Euston. Built at Derby Works with English Electric (EE) equipment, the shining black and chromium machine had been presented to the press in December 1947. Making a demonstration run to Watford later that month, it marked – for EE's publicity department, at least – a 'new page' in locomotive development. It was soon seen on express passenger turns, and soon joined by a twin (no.10001) and five further locomotives – an 827-hp diesel-electric (no.10800), an experimental diesel-mechanical machine co-designed by Col. L. F. R. Fell (no.10100), and three 1,750 hp units designed by Oliver Bulleid for the Southern Railway (nos.10201-3).



The Bulleid-designed no. 10201 appeared in 1950. Like no. 10202, it was capable of 1,750hp. A 2,000hp variant came in 1954, but all three were withdrawn at the end of 1963.

The creators and builders were confident; Riddles somewhat less so. Like many of his contemporaries, he doubted the reliability of the internal combustion engine, seeing electrification as the ultimate goal (at least for the main lines). Yet electrification was clearly a long-term project, and practical solutions were needed quickly. Thankfully, the production lines of some of the major railway workshops were in full swing on a range of pre-nationalisation steam designs. By letting this continue, Riddles could withdraw some of the oldest types BR had inherited, while he developed a suite of uncomplicated steam classes of his own.



As a 'diesel-mechanical', torque from the experimental no. 10100's engine was conveyed direct to the axles via a gearbox. Sold to BR in 1955, the locomotive was withdrawn in 1958 after a fire at Manchester.

Although no single Big Four locomotive stood head and shoulders above the rest, the resulting twelve types tended to favour LMS practice. Given the background of Riddles (and his team), this was unsurprising, although LMS engines did enjoy a high availability rate and a certain degree of standardisation.

The decision to take the Midland path was also shaped (to some extent) by the exchange trials that Riddles had initiated in BR's first year, and which involved the transfer of engines from each of the Big Four to other regions for assessment. While good publicity – and good propaganda – the trials were also the first the BTC had heard about the RE's traction policy. The former believed the latter should be taking a longer view, and wanted an assessment of the various types of motive power available. It wrote a letter to that effect in April 1948. That the RE took eight months to reply – and only then to note that a committee to address the matter had been set up – says something about the relationship between the two bodies. To a point, the problem was about personalities: the RE chairman – Sir Eustace Missenden (formerly General Manager of the Southern) – was suspicious of politicians and civil servants, while Hurcomb's diffidence did not

endear him to professional railwaymen, who – like Riddles – were irritated at having to explain or defend policies to those who knew considerably less about railways than they.



The first 'Standard' steam locomotive to be completed was no. 70000 *Britannia* , which emerged from Crewe Works in January 1951.

Yet the world outside was changing, and with Britain enjoying full employment (or something very like it), BR soon found it hard to attract new recruits. Steam locomotives demanded a great deal of looking after and could take up to two hours to prepare for traffic, even after the boiler had been filled and the fire lit. True, they were built from indigenous materials and powered by indigenous fuel, but recent coal shortages, price rises and concerns about quality had weakened this benefit somewhat, and had even led to a brief flirtation with oil firing. Add in growing concerns about pollution and the parlous state of BR's (and Britain's) finances, and it was clear the BTC had been right to encourage a wider view of motive power policy.



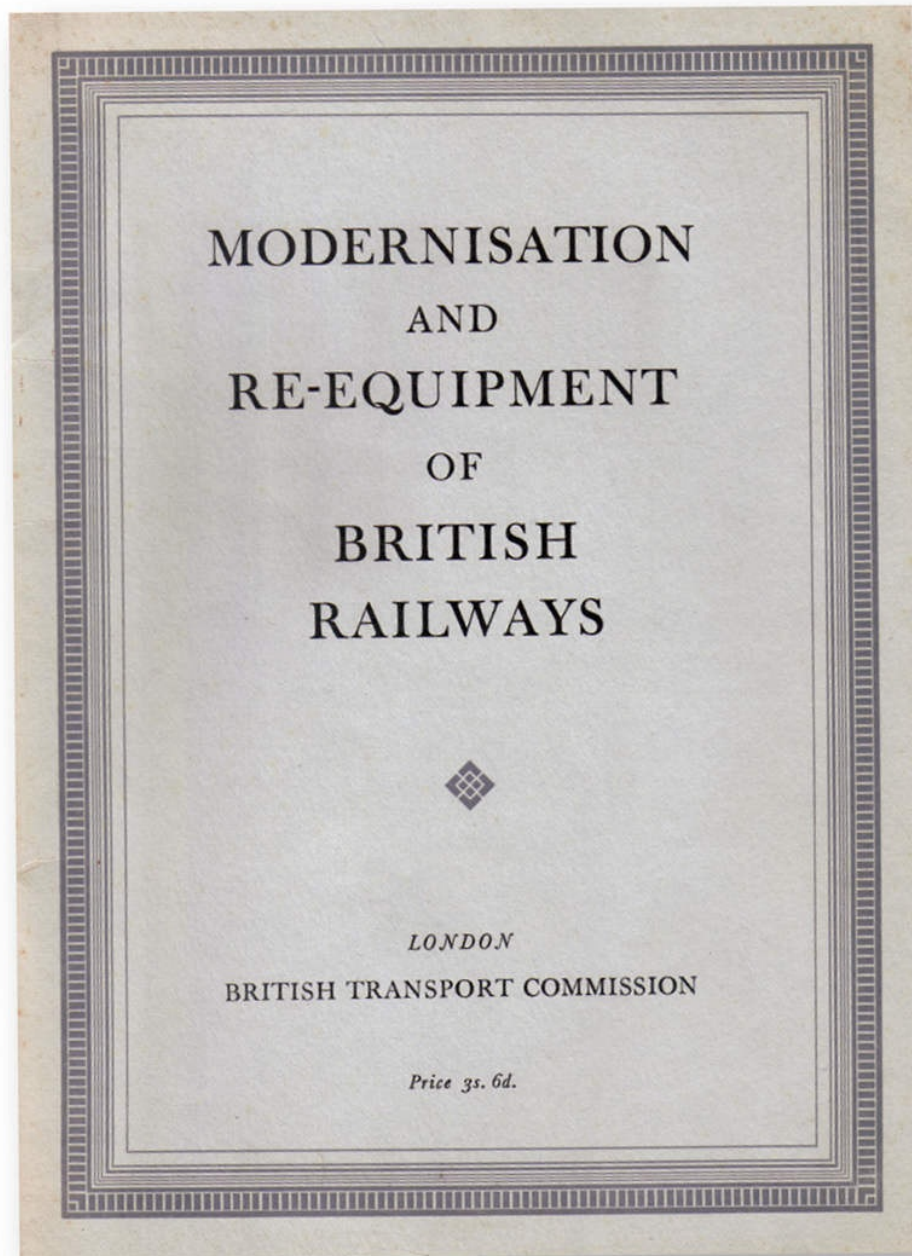
Thirty GWR-designed 'Castle' class 4-6-0s were built after nationalisation. This example – no. 7018 *Dryslwyn Castle* – appeared in 1949 and is seen here on the 'Torbay Express' near Churston.

Furthermore, improvements in standards of living had led to an increase in motor car ownership, meaning that more and more people were choosing their Morris Minors and Austin A30s (and the apparent freedom they brought) over the train. This, coupled with rising operating costs, began to turn BR's surplus into a deficit.

Unhappy with how the figures were falling – and the BTC's over-bureaucratic structure – Winston Churchill's new government produced a Transport Act in 1953 that abolished the RE and allowed the Commission direct contact with the regions. However, it also de-nationalised the road-haulage industry, launching a sell-off of over 20,000 lorries to private firms, which could offer prices that undercut the railway (constrained as it was by a 'common carrier' status that meant it could refuse no consignment). Nevertheless, BR continued to compete by replacing old-fashioned yards with a smaller number of mechanised ones, where palletised goods were shifted by fork-lift trucks, cranes and conveyor belts, instead of armies of muscle-bound men.

Some of these measures were brought about by General Sir Brian Robertson, who had taken over from Hurcomb that September. A distinguished army veteran of two world wars, Robertson saw the railway as a public service that he was duty-bound to deliver to a high standard. It was clear that this could only be achieved by modernisation, so he established a committee, which published its findings at the end of 1954.

The so-called 'Modernisation Plan' was supported by the government, which set aside £1,200 million of public money to be spent on it over fifteen years. The aim was to 'exploit the great natural advantages of railways as bulk transporters of passengers and goods and to revolutionise the character of the services provided for both'. With Riddles having retired, and technology having moved on, this 'revolution' would not only involve mechanisation, more colour-light signalling, and permanent way improvements, but also the substitution of steam by diesel and electric traction. The Plan recognised that much 'useful experience' had been gained with the designs BR had inherited, and asserted that, 'in view of the high degree of reliability attained in other countries where diesel traction has been widely adopted, there is no reason to doubt that equally satisfactory results will be realised here'.



The 'Modernisation Plan', published at the very end of 1954, brought great change to Britain's railways.

It was an optimistic view, the 'Fell' diesel-mechanical and no. 10800 having fallen way short of expectations, while the five mainline locomotives equipped with English Electric engines (nos. 10000–1 and 10201–3) had not impressed as much as their designers had hoped. Partly it was a lack of spares, partly a lack of know-how – though it didn't help that repairs were often made under 'steam conditions', whose dirt and grime were hardly conducive to the fine tolerances

needed to keep a diesel engine in good order. When working properly, the 'five' could put in some good performances, it was true, but their overall record was somewhat erratic and saw many long periods out of service.

Still, like many things from the minds of managers, modernisation looked good on paper, and a 'Pilot Scheme' was duly developed to test various power levels, wheel arrangements and transmission systems. Orders for 174 locomotives had been placed with a number of manufacturers by November 1955, but would what looked good on paper, run well on rails? The next five years or so would provide some painful answers to that question.



Former Southern Railway 'West Country' Pacific no. 34004 *Yeovil* , seen at Perth during the 1948 'exchange trials'.

PILOT PIONEERS

Through the gleaming gates sits a gleaming green beast, its bonnet almost black in the sunshine. A man makes a speech, another turns a handle and the locomotive comes to life as light trips off its bufferbeam...

It's 3 June 1957, and this is D8000, the first Pilot Scheme prototype to be completed. We're watching with the crowd at the Vulcan Foundry, Newton-le-Willows, marvelling at the fact that – in fifteen days' time – the machine we've worked on will be delivered to BR.



D8000 on test in August 1957. In all, 228 locomotives of this design would be built, production resuming after its superiority over the Clayton Type 1 (see page 34) had become apparent.

English Electric was unique in Britain, being the only company able to manufacture a diesel locomotive's mechanical parts, engine *and* electric transmission. It had also been behind the power units in nos. 10000, 10001 and 10201–3, and was no stranger to the export and domestic industrial markets, having supplied units to Sudan, Egypt and the National Coal Board, among others. Yet these were still uncharted waters for its customer, BR having already

reneged on its plan to assess the Pilot Scheme properly, ordering a further 143 locomotives before the first had turned a wheel, as it clamoured to cut costs, combat coal quality issues, beat recruitment problems and comply with the Clean Air Act of 1956. Ironical, then, that the 'first-born' would be among the best of the bunch...



The D8200s were designed by British Thomson-Houston and built between 1957 and 1961. D8243 (left) is seen at Liverpool Street in original livery.

D8000 fell into the Type 1 power category, able to exert 42,000lb of tractive effort via its 1,000hp engine. All twenty of the first batch were allocated to the new diesel depot at Devons Road, Bow, from where they soon put in impressive performances on cross-London freights – and soon outpaced their fellow Type 1s, the British Thomson-Houston D8200s and North British-built D8400s, both of whose Paxman engines – like no. 10800 before them – used sixteen cylinders for a mere 800hp, against the eight of the more powerful English Electric machines. More cylinders meant high maintenance costs for low power from an engine whose cylinder heads were prone to cracking, whose pistons were prone to seizure, and whose engine rooms were not unknown to fire.



D8400 – the doyen of its class – is seen at Bethnal Green in 1961. Like the D8200s, the D8400s suffered piston and cylinder head problems.

The D8400s had the added disadvantage of an inefficient engine cooling system, which led to further seizures – and further periods ‘on shed’ awaiting repair. Though used by the Eastern Region on excursions to Brighton and Eastbourne, their numbers never swelled beyond the original order for ten, unlike the D8200s, of which there were eventually forty-four, the second batch incorporating some design improvements (though they were still expensive to keep running and – in common with the D8400s – always required double manning, due to the poor visibility afforded by their small cabside windows and long bonnets).



D5505 on passenger duty at Lowestoft. Only the outermost axles on each bogie beneath the D5500s were powered, giving them an 'A1A-A1A' wheel arrangement, the 'A' denoting powered axles, the '1' denoting unpowered ones.

There were five contenders in the 1,000–1,500hp Type 2 category, the first to appear being D5500, a mixed traffic unit built by Brush Traction of Loughborough. Like English Electric, Brush had experience of the export market, having secured an order for twenty-five locomotives for the Ceylon Government Railway in 1950. Completed in September 1957, D5500 was tested before being allocated to Stratford depot on 31 October – an appropriate day in the eyes of many local railwaymen, who watched this 'demon' arrive with some suspicion, knowing that their working lives were about to change. They were right, of course, though at first the revolution came not with a roar, but a whimper, the locomotive and its nineteen classmates seemingly underpowered for the semi-fast passenger duties the Operating Department had in mind for them. There were also problems with their control gear and, consequently, many failures. As a result, the D5000 series was chosen to be the 'standard' Type 2. These began to appear from July 1958 and were built to BR's own design, using Sulzer engines and British Thomson-Houston electrical equipment. Though intended for the London Midland, fifteen were sent to the Southern for a while, to let steam be withdrawn on Kent Coast services. By this time, however, the 'Brush 2s' had settled into satisfactory routine service on the Eastern, which

decided it wanted more of the same; forty more were duly ordered.



D5300 basks in the autumn sunshine at King's Cross in 1960.



Originally seen as the 'standard' Type 2 design, the D5000s began to appear in 1958. In this view, D5062 hauls a freight through Elsenham in May 1960.



Despite a reputation for unreliability, there would eventually be fifty-eight NBL diesel-electric Type 2s on BR's books. D6141 (left) is seen here at Inverness alongside a locomotive of more successful design.

Pilot Scheme deliveries continued throughout 1958, the D5000s being joined by the Crossley-engined D5700s from July, the BRCW-built D5300s from August and the North British D6100s at the end of the year. The D5300s were the most successful, being tested largely on the Eastern before settling down for a short spell on the Great Northern, ahead of their migration to Scotland in April and May 1960. The D5700s were noted for their unusual wheel arrangement, having one two-axle bogie ('Bo') and one three-axle bogie ('Co') – hence the nickname 'CoBo'. However, what really set them apart was their use of a two-stroke engine, as opposed to the more usual four – the first and only application of this type in Britain until the late 1980s, when the US-built General Motors (GM) Class 59s began to appear on Somerset stone trains. In fact, GM had already developed a successful range of two-stroke engines, but lobbying from the domestic diesel engine industry – coupled with a lack of foreign currency – prevented purchase. Crossley's version, though less sophisticated than its US counterpart, had enjoyed good reports from the Admiralty. This – plus the fact that Oliver Bulleid was trying the same arrangement in Ireland using Metrovick electrical equipment, along with Metrovick's own good reputation – led to a

Pilot Scheme order for twenty.



D5718 on the 'Condor' – BR's Anglo-Scottish express freight service – in 1960. The D5700s proved so unreliable on this train that customer demand dropped until alternative traction was provided.

Maybe it was because Navy use would have been at a generally constant loading, whereas rail applications involve a constant cycling of power to meet the varying requirements of a journey; maybe it was the Navy's use of on-board engineers for running repairs. Either way, Crossley's good name soon began to drown in a sea of engine failures. One of the worst problems involved stress cracking on the crankcase, which led (among other things) to a programme of major works – and a decision not to re-order.



D5901, an English Electric Type 2 (more commonly known as a 'Baby Deltic'), arrives at Oakleigh Park with a local passenger service in August 1961.

At this stage, there was no question that diesels were cleaner than steam, required less maintenance and were ready for action at the touch of a button – when they worked. Unfortunately, they often didn't: in the case of the D5900s, it would be problems with the power unit and auxiliary equipment – so much so that, by October 1960, forty-four engine changes had occurred across a fleet of just ten locomotives. In the case of the D6100s, it was – like the D8400s, and all other NBL diesel locomotives – the cooling system that failed most frequently, though fitters lamented the awkward component positioning within, which meant that even simple faults could only be fixed in a depot or works. The sudden influx of new traction types could also be hard on drivers, some of whom now had four, five or six different diesel classes with which to familiarise themselves. Depots felt the strain too, the training programme cutting the number of crews available to work their normal services and the number of artisans on shed to keep things running.

By this time, a reappraisal of the Modernisation Plan had advocated pressing the scheme ‘forward at a rate faster [...] than planned hitherto’, in order to speed ‘the improvements on which future revenues depend’. This saw even more orders placed for largely untested locomotives – which is why, despite the BTC’s resolve to eliminate all the under-performing NBL Type 2 diesel-electrics, it still ended up with fifty-eight of them. If that sounds expensive, it was, and though passenger receipts rose by £2 million and operating costs fell in 1959, a recession in the steel industry two years later added significantly to BR’s mounting deficit. The Commission had been trying to save money by expanding its fleet of multiple units and railbuses, and by closing loss-making lines, but it wasn’t enough: in 1960, Transport Minister Ernest Marples appointed a special committee to find ways of reducing the Plan’s expense. Doctor Beeching was on his way...



The Modernisation Plan included West Coast Main Line electrification, whose ‘pilot scheme’ – exemplified by E3018 – was more successful than its diesel counterpart. The cost of electrification itself would come under much scrutiny, however.



D841 *Roebuck* – one of the North British ‘D800s’ – at Paddington. Swindon locomotives used Maybach engines connected to Mekydro transmissions, but the NBL examples married MAN engines to Voith transmissions.

POWER STRUGGLE

The boy at Plymouth's platform edge stands on the brink of change. It's November 1962 and he's ten. He knows little of the Cuban missile crisis that had worried his parents the month before, knows more of the impending doom of the mighty 'Kings' that had hauled the great expresses on God's Wonderful Railway since the late '20s. Yet within three years, his head will be filled with the Beatles and Stones as he laments the ever ebbing tide of steam; within eight, he'll have abandoned railways altogether as he tries to form a band like his hero Jimmy Page. It is the way of things: times change; people move on. And the railway was moving quicker than most...literally...



The first English Electric Type 4, D200, runs light at Wensum Curve. Like all Pilot Scheme Type 4s, its unpowered outer axles helped distribute the weight more evenly.



D2 *Helvellyn* captured at Crewe. The locomotive is one of the ten-strong class of Derby-built Type 4s, which featured BR's favoured Sulzer engine, but whose weight saw relegation to heavy freight traffic. Named after British mountains, they became known to many as 'Peaks'.

June had seen services sped up on the East Coast Main Line, while improvements to the timetable on the Southend, South Clydeside, Chelmsford–Colchester and Liverpool–Crewe routes followed as electrification began to spread. Further improvements came in the autumn, as diesels took over Paddington–Wolverhampton services and those over Midland metals from St Pancras.



D102 – from BR's second 'Type 4' batch (also known as 'Peaks') – coupled to a pair of 'brake tenders', which provide extra braking power on freights formed entirely (or largely) of 'unfitted' wagons.

Faster trains meant more powerful locomotives, preferably of 2,000hp or more. The Pilot Scheme had addressed this need with two diesel-electric designs, the first of which was a development of no. 10203. And, like no. 10203, the English Electric Type 4 was a heavyweight machine, which also required four axles per bogie to spread the load and allow it to run over routes engineered to lighter standards. The doyen, D200, had been delivered to the Eastern Region in March 1958. For a short time, it and the remaining nine of the order became top link engines, working named trains like the 'Flying Scotsman', the 'Master Cutler' and the 'Tyne Tees Pullman'. Robertson was unimpressed, however, believing the D200s to be insufficiently powered to maintain high speeds when hauling heavy trains.

This theory was proved correct when the loading was anything above seven coaches, flashovers being frequent when running fast, although their bulk was a boon when working (or rather, trying to stop) long unfitted freights (which lacked continuous brakes). Solid enough for BR to order a further 190, they failed to replace steam on East Coast Main Line expresses, although they did become a regular feature on the London Midland, where they tackled the steep Camden Bank north of Euston with ease, and where the need for long periods of sustained speed was less acute.



The final 'first generation' Type 4s retained the Sulzer engines of the earlier series, but utilised Brush generators and traction motors instead of Crompton Parkinson equipment. Here, D190 passes Welwyn.

The other Pilot Scheme Type 4 was built by BR's own Derby Works, which had also built nos. 10000–1. The LM's Mechanical Engineering Department was more interested in the Sulzer engine, yet the resulting ten locomotives were just as heavy as their EE counterparts and therefore just as ill-suited for high-speed passenger work. They soon found themselves downgraded to heavy freight haulage in the East Midlands, although the two classes that evolved from them saw front-line service for more than twenty years, latterly on passenger trains across the Pennines and between the North East and South West.



‘Diesel-hydraulics’ – like North British-built D601 *Ark Royal* , seen at Paddington in August 1958 – use a pump-like torque converter to convey power (via gears) from the engine to the wheels.

With hindsight, it seemed like BR’s Type 4s were suffering something of a weight problem. One solution seemed to be evident on the Continent, where the German State Railway’s lightweight diesel-hydraulic locomotives were acquitting themselves admirably. Riddles’ successor, R. C. Bond, had expressed an interest in testing locomotives of this type after witnessing trials of two units North British had built for Mauritius. As NBL had also prepared – at its own expense – designs for 1,000 and 2,000hp machines suitable for the home market, Bond pressed the Commission to add both to the Pilot Scheme, so they could be assessed against diesel-electric traction. Though the Chief Electrical Engineer was unimpressed, orders were duly placed for eleven locomotives in February 1955.

It made sense to concentrate the ‘hydraulics’ in one place and, in this, Bond had the full support of the Western Region, which looked favourably on the concept, partly because of its limited experience of electrics, and partly because there were no plans to electrify the lines out of Paddington. This meant it was faced not so much with a longer-term dieselisation programme than intended for the other regions, but a *complete* one. There was a chance that a hydraulic

strategy would help it make the best of this situation. And there *were* certain benefits.

For example, the German V200 series featured monocoque (stressed-skin) construction (as developed by the aircraft industry), which allowed them to combine high power and low weight – a configuration that could increase haulage capacity by two coaches. Any concerns that a lighter locomotive would be less suitable for heavy freight were allayed by the Modernisation Plan pledge that loose-coupled goods trains were to be abolished.

The first diesel-hydraulic to emerge from North British was D600, a Type 4. Officially completed on 25 November 1957, it was handed over to BR the following month. A press run between Paddington and Bristol Temple Meads on 17 February 1958 went well, though the locomotive's twin-engine configuration demonstrated its worth on the return journey, when one of them cut out soon after departure. And while the D600s put up some good performances in their first two years, it could be argued that they did not exploit the full potential of the diesel-hydraulic, being – at 117.5 tons – a standard heavyweight design, not so very different from their diesel-electric contemporaries, and certainly not comparable to the V200s (on which the WR looked as the 'ideal'). Thankfully, German manufacturer Maybach had offered the Region a set of powertrains in March 1955, thus giving Swindon the chance to construct a scaled-down version.



Swindon-built D801 *Vanguard* on test near Bristol. Like the D600s, most D800s were named after British warships. The bogie problem mentioned in the text had been solved by 1963.

The BTC approved an order for three of these locomotives the following February, the first of which – D800 – emerged from Swindon Works in June 1958, some 29 tons lighter than its North British counterpart. After being named *Sir Brian Robertson* the following month it was put to work on the famous ‘Cornish Riviera Express’ from Paddington to Plymouth. Despite poor riding on pointwork or poorly maintained track, thanks to the way the bogies were attached, performances were impressive and 100mph was often exceeded. As a result, no further D600s were ordered, but there would eventually be thirty-eight ‘Swindon’ Type 4s and thirty-three similar locomotives built by North British, which was also responsible for the D6300 series Type 2s that entered traffic from January 1959. Sadly, this lower-powered design soon started to suffer engine and transmission faults, and – though reliability had improved by 1962 – the fortunes of the manufacturer had not: NBL became insolvent and went into voluntary liquidation in the April of that year, despite a backstage attempt to win another order. There had just been too many delays, too many failures, too many locos laid up in sidings.



D1000 *Western Enterprise* resplendent in 'desert sand' livery at Paddington. The design team used by BR tried several schemes on this class, before 'carriage maroon' was adopted as standard.



Though largely unsuccessful, the diesel-hydraulic D6300s were used extensively in Cornwall, and around Bristol and London. Here, D6354 waits at Old Oak Common with Pannier tank no. 8481.

By this time, the elegant D1000s were starting to emerge from Swindon and Crewe, with their twin engines and 90mph capability, both intended to improve the timings of the Western's crack expresses. Though older drivers may have

seen them as the ugly, modern enemy of steam, imagine yourself a young trainee, signing on at Old Oak Common...

You've swapped your Ian Allan *ABC* for a black leather bag, your bottle of Tizer for a billy can of tea and your school books for a plethora of rules and regulations. Your first job is the 10:00 from Paddington to Wolverhampton, your charge is D1001 *WesternPathfinder* – fresh from Swindon Works and resplendent in BR carriage maroon. The driver shows you how to 'count the wheels' – railway parlance for a quick check that everything's as it should be – including the fuel gauge, which is outside the locomotive, as it is on all main-line diesels. With everything shipshape and Swindon fashion, you climb the footsteps, walk through the vestibule, and turn right into the cab. The driver puts the master key in the slot, the reverser to 'engine only', checks his safety equipment and opens the controller. Soon, you'll be 'hooking on' to your train; soon you'll get the 'Right Away'; soon you'll be pulling out of Platform 3 before powering past Westbourne Park and Ladbroke Grove.

The Region had wanted a 3,000hp diesel-hydraulic for hauling coal, but negotiation with the Commission led to the development of these 2,700hp machines. Very impressive they looked too at the head of a gleaming rake of carriages, surging over the metals from the capital to points west. And yet – like the 'Standard' steam classes of the decade before – their days were numbered almost as soon as they had begun.



D1001 *Western Pathfinder* stands at Swindon.
A secretary at the WR offices suggested the 'Western' prefix to give cohesion to a number of disparate name lists.



Though the Clayton Type 1 was deemed the standard design for its power range, the locomotives were demonstrably inferior to their English Electric counterparts (see page 18); withdrawals began in 1968.

SETTING THE STANDARDS

The real question is whether you, as owners of the railways, want us to go on running services at very high cost, when the demand for them has very largely disappeared .

So Dr Richard Beeching asked cinema audiences in 1963. By this time, he'd sat on a committee set up to find ways of reducing the Modernisation Plan's expense (*inter alia*), taken over from Robertson at the BTC, remained in office when it became the British Railways Board (BRB) and was now advocating 'radical changes' to improve BR's finances by suggesting that the replacement of steam be accelerated, stopping passenger services be cut, and loss-making stations be shut.

In the event, these measures only contained BR's deficit, but though history would remember Beeching as the 'axeman', his legacy was actually much wider, and included new staff appraisal schemes, improved training programmes, up-to-date management methods... and a new image.



Dr Richard Beeching took over from Sir Brian Robertson as BTC chairman in 1961, remaining in office when the Commission became the British Railways Board on 1 January 1963.



In original livery, D0280 *Falcon* prepares to leave King's Cross in 1962. BR's Chief Engineer (Traction and Rolling Stock) was reportedly unimpressed with Brush's use of high-speed Maybach engines therein.

British Railways – with its dark greens, maroons and browns – had started to look a bit ‘old hat’, so Beeching gave the company’s design team a clear brief to create a sleek, business-like identity, which would help bring confidence and cohesion to the network. The following May, its initial efforts were revealed when the experimental ‘XP64’ was released from Derby Works. Featuring new carriages with smarter interiors, better soundproofing, pressure ventilation, and improved suspension, its most eye-catching element was perhaps its livery: a shade of turquoise blue matched with light grey, quite unlike anything that had gone before. At the front of the train – and the ‘cultural revolution’ in many ways – was a new locomotive: the Brush Type 4.



Like DP2, D0260 *Lion* began tests in service during May 1962. The media dubbed the BRCW-built locomotive the ‘great white hope’; ‘great white elephant’ might have been more appropriate.

As far as the industry was concerned, the story began in January 1960, when the BTC published its requirements for a new breed of 2,500hp machines, having realised – diesel-hydraulics apart – that the weight of its two Pilot Scheme classes was too great, and that the restrictions this imposed on their spheres of operation were unacceptable. Tenders were invited, but a possible winner was already under construction by Brush – the future D0280 *Falcon* , which featured two high-speed Maybach engines of the type then being installed in the diesel-hydraulic D1000s.



English Electric's DP2 about to enter Northchurch Tunnel on a passenger working. The locomotive showed it was possible to build a 2,700hp 'diesel-electric' that weighed less than a comparable 'diesel-hydraulic'.

The locomotive, which emerged in the autumn of 1961, was soon joined by two other prototypes: DP2 (from English Electric) and D0260 *Lion* (built by the Birmingham Railway Carriage & Wagon Company, in association with Sulzer and Associated Electrical Industries). Both were handed to BR for trials in May 1962, though the truth was that BRCW's bid had already been accepted, BR's Chief Engineer J.F. Harrison finding much favour with the control system developed by Sulzer and AEI. Yet when the last twenty 'Peaks' were cancelled, it would be *Brush* that was asked to use the same electrical equipment in a corresponding number of lighter locomotives, per the new Type 4 specification. BRCW offered to build them in a subcontractor capacity, but their price was deemed too high. There were also growing concerns about the company's reliability, which ultimately led BR to stick with Brush – a *volte face* that meant closure for BRCW, and a move towards standardisation for BR. The latter was becoming ever more necessary, the urgency with which so many classes had been ordered in the 1950s having become a source of inflated training and maintenance costs, as freight traffic dwindled and competition from domestic airlines and private motor cars grew.



With a fine array of contemporary cars in the foreground, this view-from-a-train shows a number of Brush Type 4s under construction at the company's Loughborough works.

The first 'Brush 4', D1500, was completed in September 1962 and underwent trials before entering service on the East Coast Main Line. The remaining nineteen of the initial batch had been delivered by the following May. By December 1963, authority had been granted to order a further 150; by the summer of 1968 there would be 512, all bar the Southern receiving an allocation (though even here they could be found on certain services out of Waterloo).



A pair of Brush Type 4s – sporting original two-tone green livery – sit in the sunshine at Shrewsbury, c . June 1964.

This ‘go anywhere’ idea was vital to the standardisation policy, which also extended to train heating, it being recognised that electricity was more effective and more efficient than steam in this regard. D1500–19 were fitted with the requisite equipment from new, just as the first locomotives to address a gap between the Type 2 and Type 4 power ranges had been: D6500, a 1,550hp diesel-electric built (ironically) by BRCW, entered traffic in December 1959 and was followed by ninety-seven more over the next two years. Intended to allow steam to be eliminated from freight and engineering traffic in the southeast of England, they also found themselves on Kent Coast passenger turns in the run-up to electrification – no problem in the summer months, but when the winter of 1960–61 came along, passengers froze as the locomotives were unable to warm the older steam-heated carriages. The solution was to draft in Sulzer Type 2s from the London Midland until more modern rolling stock became available. Trains were doubleheaded, but as the Type 2s had to be coupled directly to the carriages, complicated shunting manoeuvres were required at terminal stations.



‘Type 3’ referred to the 1,500– 1,999hp power range. Between 1960 and 1962, BRCW built ninety-eight such locomotives for the Southern Region – including D6556, seen at Salisbury in 1964.



Beyer Peacock built 101 diesel-hydraulic Type 3s for the Western Region. Introduced from 1961, their Mekydro-manufactured transmissions led them to be dubbed ‘Hymeks’. Here, D7039 nears Ham Hill.

The haulage benefits of double-heading were demonstrated by the D6500s on the weekly Cliffe–Uddington cement trains, but the practice really came into its own with what was arguably the most successful Type 3: the English Electric Type 3, which began to appear from 1960. Though their reach would extend virtually across the whole country, in 1965 D6881 and D6882 underwent high-speed trials on the Western, the success of which led to the introduction in 1966 of eight ‘ton-up’ services diagrammed for pairs of EE Type 3s. It was an indication that diesel-electrics had caught up with their hydraulic counterparts. Both transmission types were capable of giving good service, yet all regions bar the Western were equipped to maintain the former, which were also cheaper to build and maintain, the latter being blighted by an ignorance of torsional stress, which condemned components to a short life, and thus increased running costs – particularly as many parts had to be imported from Germany. Comparisons between various classes were considered and commented on in a 1965 report, which confirmed the Board’s view that diesel-electrics were the most suitable for BR’s operating conditions. A decision had been made: henceforth hydraulics were non-standard. The future belonged to electric traction – in one form, if not another...



EE Type 3s D6882 and D6881 leave Paddington. The ‘hydraulic’ case had been hampered by slow progress regarding continuously braked freight trains, which do not need heavy locomotives to help bring them to a stand.

THE RATE OF CHANGE

Ten years before, Gresley's A4 – with its 'speed of a greyhound, strength of a boar' – would have flown south with a train of ten behind. No more. For this is 1966, not '56, and today *Bittern* is pulling in to Glasgow from the north, the class having been demoted to the Aberdeen road ahead of their now imminent demise. At Edinburgh Waverley, about to head south in their stead, is the reason why: progress, in the shape of D9006 *The Fife & Forfar Yeomanry*, whose gunboat drawl throbs throughout the trainshed as it awaits the 'Right Away'.



Gresley A4 no. 60019 *Bittern* at Larbert in 1966. The quotation in this chapter's opening line comes from *Elizabethan Express*, a film made in 1954 to advertise Anglo-Scottish travel.

By this time, Beeching had been replaced by long-term public servant Stanley Raymond, who had a clear vision of how the railway should be developed, and did not accept road and air competition as a *fait accompli*. Keen to hone BR's marketing strategy, he also strove to create a nationwide 'brand' with a clear identity. Thus in 1966, 'Motorail' became the new name of BR's car-carrying passenger service and 'Inter-City' became synonymous with comfortable, crack expresses. The 'Deltics' – of which D9006 was one – fitted this image perfectly;

the A4s did not, and their numbers were shrinking fast. They weren't alone, for now even the 'Standards' – themselves barely ten years old – were on the way out. The average lifespan of a well-maintained steam locomotive was around thirty years, so this policy seemed like a terrible waste to many, despite the apparent economic and operational reasons behind it. Odd to think, then, that diesel traction could have come to the East Coast Main Line much sooner than it did...



43 D9021 *Argyll and Southern Highlander* at Edinburgh in September 1966.

The LNER had invited tenders for twenty-five 1,600hp diesel-electrics back in 1947 to replace thirty-two of its mighty Pacifics. A number of firms – including North British, BTH, English Electric and BRCW – responded, but the valiant hope was dashed by the Railway Executive with some speed after nationalisation. However, when D. Napier and Sons – an EE subsidiary – produced a lightweight, high-powered engine for Royal Navy patrol vessels, the parent company used a pair to test their suitability for railway applications. The result – *Deltic* – was a vision in powder blue, and the most powerful locomotive in the world when it appeared in 1955.

Trials began on the London Midland Region, though at first EE asked that the locomotive be kept off passenger turns, as they feared that the complexity of the design – and the unreliability of the steam heating boilers – might lead to reputation-damaging repairs in service. A series of successful freight turns,

however, saw *Deltic* put on the ‘Merseyside Express’ from Liverpool to Euston. By the end of 1958, it was clocking up 700 miles a day.



Deltic itself is seen at Ordsall in June 1960. The name derives from the locomotive's triangular cylinder arrangement. It was donated to the Science Museum in 1963.

Tests were also carried out on the Settle & Carlisle route, but it was on the Eastern that *Deltic* made a real impression, not least on the Region's charismatic General Manager, Gerard Fiennes. Fiennes realised that no Pilot Scheme locomotive would allow his principal Anglo-Scottish services to be accelerated; *Deltic* offered the power – and the timetable opportunity – he needed. Unfortunately, clearance problems between Newcastle and York meant it had to run via the West Coast and Waverley routes to get to Edinburgh, but it gave notable service on expresses between King's Cross and Doncaster, including one memorable morning in February 1960, when the 8:20 – all 250 tons of it – was taken up Stoke Bank at 100mph. Unfortunately, a serious oil leak later that year would lead to withdrawal the following March, but by then the twenty-two modified production versions were entering service.

And what service: such was the power available that the well-known author O. S. Nock commented on the surge that could be felt when the throttle was

opened to the full – though the roar from the engines that came with such sensation, while thrilling to enthusiasts, was not so popular with crews, who were issued with ear muffs until soundproofing had been improved! There were also problems with the traction motors, which were prone to flashovers, and a tendency for the wheels to slip – particularly at high speeds. The solution came when the ‘Deltics’ were converted to electric train heating. Discovery that there was no room for the requisite auxiliary generator meant the supply had to come from the leading engine in either direction. This had the effect of producing a faster idling rate, which not only provided a more controllable rise in voltage to the traction motors, but also helped reduce ‘wheelspin’.



The prototype's moniker became the production class's nickname, hence a 'Deltic' leaves York for London in 1967.



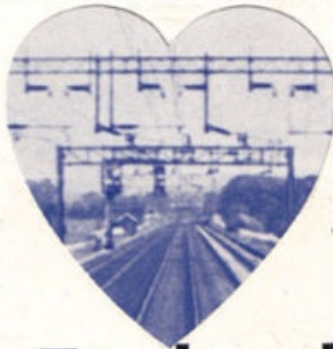
An English Electric Type 1 runs bonnet-first at York. Ironically, it had been the lack of crew visibility when working thus that led to the design's initial fall from favour.

Conversions would be complete by the end of the decade, though by 1967 the locomotives were settling well into service and modernisation was well and truly gaining pace, with new liveries appearing on trains, new uniforms on staff, and new posters on billboards and bridges. Diesel reliability in general was improving, BR having built more bespoke depots, with their comparatively clean conditions and artisans growing ever more adept at dealing with their new charges. And with steam now gone from the Western, gone from Scotland and going from the Southern, the publicity machine looked to the West Coast Main Line as the paragon of this brave new world.

We've moved

LONDON, MANCHESTER
AND LIVERPOOL

**closer to
the heart of**



England

A leaflet produced to promote BR's electric West Coast Main Line services.

Electrification of the Crewe–Liverpool Lime Street section had been completed in January 1962, after which the wires went up towards London. The

official start of BR's full public timetable of electric-hauled Inter-City services from the capital had come on 18 April 1966. Thankfully, the electric 'pilot scheme' had been rather more successful than its diesel counterpart, the experience gained with just five different classes resulting in a production version – the AL6, 100 of which were built by English Electric and BR's Doncaster Works. Thus, while British Transport Films boasted that the death of steam on the Bournemouth line had made travel 'clean, quiet, fast and frequent' – 'fit for the '70s', in fact – it was the lines out of Euston that had 'moved London, Manchester and Liverpool closer to the heart of England'.



The Travel Centre - Artist's Impression

The Travel Centre in the rebuilt Euston, c . 1968. This artist's impression is taken from a booklet BR produced to mark the upgrade.



Reliability had improved by 1967, but that of the 'Brush 2s' increased when their Mirrlees engines were replaced by English Electric ones.

This was a new railway, built on top of the old, and with a top speed of 100 mph, the distance between past and present was starting to widen. When the new, rebuilt Euston was officially opened in 1968, the poet and architectural commentator John Betjeman described it tersely as 'no masterpiece' and said its lack of platform seating made it an 'inhuman structure', which seemed to ignore passengers. BR, however, saw it as the flagship station on its flagship route, whose clean lines and modern signs would soon feature in films, fliers, posters and pamphlets, where tickets could be obtained from a shiny Travel Centre, coffees and cigarettes enjoyed in the Sprig Buffet, and three-course meals taken in the Lancastrian Grill. Sitting at one of the tables, the traveller might glance down to the concourse, light up another Embassy and muse on the sculpture of Britannia that used to be in the old Great Hall.



AL6 E3152 at Euston. Note the overhead wires, from which 25kV AC power is collected by the pantograph on top of the locomotive.

Of this, Betjeman would not have approved – he'd failed to save Euston's Doric Arch earlier in the decade, and was quick to join the campaign to save St Pancras and King's Cross, BR having decided to 'develop' them both. This time, the preservationists won, St Pancras attaining a Grade I listing, ensuring its future protection. Yet BR had to forge ahead, and somewhere in an office in Derby, a team of designers was working on a passenger train that promised to be a total revolution.

PLANNING FOR THE FUTURE (AGAIN)

Just after 3:15 on a July afternoon, and a cement train is heading from Cliffe to Uddingston at about 45mph. Unbeknown to the driver, one wagon begins to sway, the movement increasing until its wheels leave the rails near Thirsk. It clatters along for 170 yards, before a coupling breaks and eight wagons tumble down the embankment. In the tumult, one ends up foul of the next line. When the dust settles, the driver of an express sees the obstruction and slams on the brakes. He's too late. The collision kills seven of his passengers and injures forty-five more.



The damage caused to DP2 in the fatal collision at Thirsk on 31 July 1967 was so great the locomotive was withdrawn and dismantled for spares.

Thirsk fuelled a debate that had been building for some time. The Modernisation Plan had seen the introduction of more steel-framed wagons, which were easier to maintain, but exacerbated the phenomenon of 'hunting' – a lateral wheel oscillation at the root of many derailments. The trouble was that

being less flexible than their older counterparts made them more prone to a build-up of these oscillations following any imperfections in the track. Being laid on concrete sleepers, continuous welded rail could introduce even more rigidity, while its lack of joints meant fewer natural breaks to disrupt the effect. When these factors combined with the sustained high speeds possible with diesel traction and through braking, incidents increased alarmingly.



Beeching had advocated the 'liner train' concept, which involved the movement of containerised goods in dedicated 'express' services. Later branded 'Freightliners', they were often worked by Brush Type 4s.

Specialist research by BR's Railway Technical Centre (RTC) led to a new suspension system that could combat 'hunting' and achieve good ride quality on all types of track. The knowledge gained from this work was also applied to bogie vehicles in 1967, and materialised in the 'Mark III' coach, which was capable of 125mph travel. Such speed would be part of the future, but the reality of the now required a re-assessment of the company's motive power requirement.



In 1968, the Western Region started doubleheading certain West of England services in a bid to improve the timetable. Here, D827 *Kelly* and D829 *Magpie* leave Reading that August.

At the start of 1968, there were over 350 steam engines still at work in northwest England, but when the last whistle blew on 11 August, time had already been called on some of the Pilot Scheme's biggest failures. Among them were the D5700s, all of which had been withdrawn by October, and the D8400s, which had joined them by the end of the year. But it wasn't all about unreliability. The truth was that traffic patterns were changing, as clanking trip freights between small yards within city walls and branch line services through rural Britain were ebbing in the face of increasing road competition and the resultant 'Beeching cuts'. Coupled with this was a need to increase standards of availability and utilisation in BR's move towards containerised 'trainload' freight haulage, and a need to cut staff training and maintenance costs across the board. It was all part of a policy confirmed by BR's National Traction Plan to reduce the number of diesels on its books from around 3,000 to just over 2,200 by the mid-1970s.



Brush's experimental 4,000hp diesel-electric *Kestrel* was tested on BR from 1968. Though capable of 125mph running, it was too heavy to be driven faster than 100mph.

The Plan – first prepared in 1965, revised in 1967 and again in 1968 – gave the ‘forecast requirements’ up to the end of 1974 (‘at which time no remaining diesel or electric train locomotives will have attained twenty years’ life’). Though the long-term roster was ‘related to a global forecast’, some of the Regional casualties were obvious. The decision to standardise on electric transmission systems, for example, meant that most of the Western Region’s non-standard diesel-hydraulics would go (the future for the D1000s having been secured to 1984 – a touch over-optimistic, as it turned out). The D5900s, D8200s and the Clayton Type 1s were also earmarked for early withdrawal, while the elimination of the NBL D6100s was to be advanced. Among those to remain were the D200s and the Brush Type 2s, although the introduction of two-digit classifications meant the former became Class 40 and the latter morphed from Class 30 to 31, as their unreliable Mirrlees engines were replaced by the products of English Electric.



The D600s were withdrawn in 1967, being nonstandard among the Western's diesel-hydraulic fleet and – for the wider BR – non-standard as diesel-hydraulics. D600 and D601 await their fate at Barry scrapyard.



Withdrawn and forlorn, NBL Type 1 D8401 is seen at Cransley in March 1969.

State-of-the-art traction at this point was embodied by a new Type 4 – the Class 50, born from a mid-'60s realisation that the government was not going to approve West Coast Main Line electrification beyond Weaver Junction. EE based the design on DP2 – the ill-fated experimental locomotive that met its end at Thirsk, but with which the Operating Department had been impressed, thanks to its ability to outperform the 'Deltics' while on the East Coast Main Line. The RTC, however, had other ideas, insisting the production class's control system be regulated by (largely untried) electronics. Applying this new technology to the main generator allowed drivers to choose a particular level of tractive effort – which could be useful in low adhesion conditions. It also allowed various 'sub-systems' to be added, such as 'push-pull' functionality and the ability to drive at very slow speeds, the latter coming into use more generally on 'merry-go-round' coal trains, which were loaded at collieries and unloaded at power stations without stopping.



'Deltic' (Class 55) D9003 *Meld* passes Little Wymondley with a London-bound express in 1969 – a classic portrait of BR's contemporary 'corporate' livery.

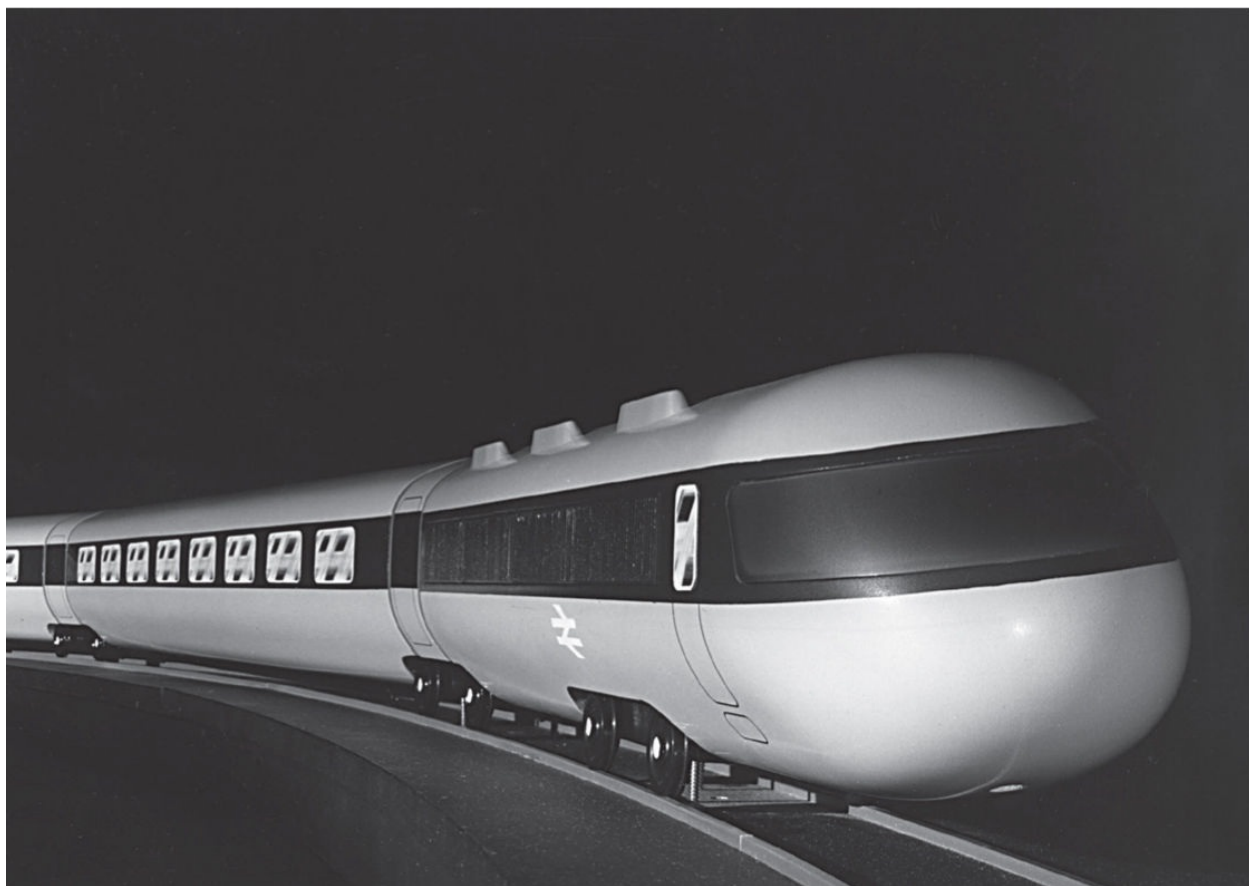
Not so much a 'box on wheels', more a 'box of tricks', then, the fifty '50s' had all been delivered by December 1968, and could be seen on express freight traffic and services to Blackpool, Liverpool, Perth and Windermere, in addition

to their intended West Coast Main Line work. Though their on-board circuitry often led to failures with no apparent cause, the class proved their worth and, when Whitehall sanctioned the upgrade of the track and signals beyond Weaver in 1969, were rostered for double-heading in a bid to improve the timetable on a route that included the punishing gradients of Shap and Beattock. The WR had already started double-heading D800s ('Class 42') on the 'Cornish Riviera' between Paddington and Penzance, while the Scottish Region was seeking to speed services between Glasgow and Edinburgh by similar means.

All these moves saved minutes, and all those minutes mattered, market research having found that, with journey times of up to three hours, rail was the mode of choice and had the added advantage of delivering travellers close to shops and office blocks. Beyond three hours, and people tended to let the plane take the strain. Electrification was a definite solution, and would reduce journey times in the Class 50 domain by 1974, but its expense suggested that – if rail were truly to compete with air – a new train would be needed.



The fifty Class 50s – introduced from October 1967 – were originally leased from their manufacturer, English Electric. The slow speed control (see page 53) was later removed due to non-use.



BR's *Next Train* exhibition of July 1969 featured this futuristic model of the APT.

In Japan, the famous 'Shinkansen' were operating at speeds of up to 130mph on purpose-built lines with gentle gradients and few curves. BR knew that to achieve the same in Britain would involve time-consuming Parliamentary Bills, public enquiries – and public money. But the ex-aerospace engineers at the RTC wondered whether faster trains could be run on existing infrastructure by improving rolling stock suspension. From this idea came the Advanced Passenger Train (APT), which could attain speeds of up to 155mph, minimising passenger discomfort by tilting into curves. The project secured partial government funding in 1968 and clearance to construct a four-car experimental unit (APT-E), test track and laboratory the following year.

Watching from the sidelines were the traditional railway engineers, a number of whom were not impressed with these 'upstarts' and their lack of experience. Though newcomers can bring fresh new ideas, this 'old guard' had seen too many mistakes being made, tests being re-run and purchase orders being re-raised. They felt sure an alternative was possible, and by the end of 1968 had sketched out rough plans for a 'High Speed Diesel Train' (HSDT), which could reach 125mph.



By 1969, BR was also considering the next generation of heavy freight locomotives, which would be capable of exerting 6,000hp at speeds of up to 125mph.

Terry Miller, BR's Chief Engineer of Traction and Rolling Stock, could also see the potential of the HSDT and submitted a formal proposal to the Board soon into 1969. New chairman Henry Johnson, a career railwayman who had started his working life with the LNER, was sufficiently impressed to give it his public support, adding that if the APT did not prove itself within the next four to six years, BR would need something reliable to fall back on. By the autumn of 1970, £800,000 had been granted for the development of a prototype.

Whichever train came first, the future of rail passenger transport clearly pointed away from tradition to the concept of permanently – or semi-permanently – fixed sets. For freight, there would be a need for more power as Beeching's 'trainload' concept brought tonnages that would have been unimaginable in the Pilot Scheme era. The call would be answered, and answered again. But by then, the railway would be a very different place indeed...



British Rail left the 1960s looking forward to 'a decade of progress such as railways have never seen'. The 'Inter-City' brand – illustrated by this c . 1970 poster – would play a key part in that progression.

DIESEL LOCOMOTIVE TYPES FEATURED IN THIS BOOK

Number series/ name	Builder(s)	Transmission system	Power classification	1968 classification
Deltic	English Electric	electric	Type 5	-
D0260 (Lion)	Birmingham Railway Carriage & Wagon Co/ Sulzer/AEI	electric	Type 4	-
D0280 (Falcon)	Brush	electric	Type 4	53
DP2	English Electric	electric	Type 4	-
HS4000 (Kestrel)	Brush	electric	Type 5	-
10000-01	LMS/BR Derby	electric	Type 3	-
10100	BR Derby	mechanical	Type 4	-
10201-3	Southern/English Electric	electric	Type 3 (10201-2); Type 4 (10203)	-
10800	North British	electric	Type 1	-
D1-10	BR Derby	electric	Type 4	44
D11-137	BR Crewe/Derby	electric	Type 4	45
D138-193	BR Crewe/Derby	electric	Type 4	46
D200-399	English Electric	electric	Type 4	40
D400-449	English Electric	electric	Type 4	50
D600-604	North British	hydraulic	Type 4	-
D800-832; D866-870	BR Swindon	hydraulic	Type 4	42
D833-865	North British	hydraulic	Type 4	43
D1000-73	BR Swindon/Crewe	hydraulic	Type 4	52
D1100-111500-999	Brush/BR Crewe	electric	Type 4	47/48
D5000-150	BR Crewe/Darlington/ Derby	electric	Type 2	24
D5151-299; D7500-677	BR and Beyer-Peacock	electric	Type 2	25
D5300-46	Birmingham Railway Carriage & Wagon Co	electric	Type 2	26
D5347-5415	Birmingham Railway Carriage & Wagon Co	electric	Type 2	27
D5500-699; D5800-62	Brush	electric	Type 2	30/31 (1)
D5700-19	Metropolitan-Vickers	electric	Type 2	28
D5900-09	English Electric	electric	Type 2	23
D6100-57	North British	electric	Type 2	21/29 (2)
D6300-57	North British	hydraulic	Type 2	32
D6500-97	Birmingham Railway Carriage & Wagon Co	electric	Type 3	33
D6600-8/6700-999	English Electric	electric	Type 3	37
D7000-100	Beyer-Peacock	hydraulic	Type 3	35
D8000-199; D8300-27	English Electric	electric	Type 1	20
D8200-43	British Thomson-Houston	electric	Type 1	15
D8400-09	North British	electric	Type 1	16
D8500-616	Clayton	electric	Type 1	17
D9000-21	English Electric	electric	Type 5	55

NOTES

1. Under BR's 1968 reclassification scheme, Class 30 was used to denote the original 'Brush Type 2s', which became Class 31s when their ailing Mirrlees engines were exchanged for English Electric machines. The last locomotive to be upgraded was D5500 in 1969.
2. Type 2 diesel-electric locomotives supplied by North British were designated 'Class 21'; twenty became Class 29 as their troublesome MAN engines were replaced by Paxman ones.

POWER CLASSIFICATIONS :

Under the Modernisation Plan, three power categories were originally envisaged: Class A (up to 1,000hp), Class B (1,000–1,500hp) and Class C (2,000hp upwards). These were later amended to the following designations:

- Type 1 (up to 1,000hp)
- Type 2 (1,000–1,499hp)
- Type 3 (1,500–1,999hp)
- Type 4 (2,000–2,999hp)
- Type 5 (3,000hp upwards)

FURTHER READING

This book is intended to summarise the development of British main line diesel traction in the 1950s and '60s and is not, therefore, an exhaustive survey. More detailed information may be found in the following:

Bonavia, Michael R. *British Rail: The First 25 Years* . David and Charles, 1981.
Clough, David N. *Hydraulic vs Electric: The Battle for the BR Diesel Fleet* . Ian Allan, 2011. Expands on, and analyses, the situation outlined in Johnson and Long (see below).

Gourvish, T. R. *British Railways 1948–73: A Business History* . Cambridge University Press, 1986.

Haresnape, Brian. *British Rail 1948–1978: A Journey by Design* . Ian Allan, 1979.

Johnson, John and Robert A. Long. *British Railways Engineering 1948–80* . Mechanical Engineering Publications Ltd, 1981. The engineering story, told by engineers, and edited by former BR Chief Mechanical Engineer R. C. Bond.

Morse, Greg. *British Railways in the 1950s and '60s* . Shire, 2012.

Morse, Greg. *British Railways in the 1970s and '80s* . Shire, 2013.

Tufnell, R. M. *The Diesel Impact on British Rail* . Mechanical Engineering Publications, 1979. Excellent engineering history.

Webb, Brian. *Armstrong Whitworth: A Pioneer of World Diesel Traction* . Lightmoor Press, 2010. In-depth study of early British diesel developments.

Plenty of photographic albums featuring BR diesel locomotives in the 1950s and '60s are also available, while many of the source documents referred to in this book – including the Modernisation Plan – may be downloaded free of charge from The Railways Archive: www.railwaysarchive.co.uk



A 'Brush Type 2' (Class 31) being serviced at Stratford depot in September 1969.

PLACES TO VISIT

MUSEUMS

Barrow Hill Roundhouse Railway Centre , Campbell Drive, Barrow Hill, Chesterfield, Derbyshire, S43 2PR.

Telephone: 01246 472450. Website: www.barrowhill.org Britain's only surviving operational roundhouse engine shed; frequently holds modern traction events.

Crewe Heritage Centre , Vernon Way, Crewe, Cheshire, CW1 2DB. Telephone: 01270 212130.

Website: www.crewheritagecentre.org

Includes the APT-P, among other modern traction exhibits; also offers the chance to drive a diesel locomotive on its demonstration line.

National Railway Museum , Leeman Road, York, YO26 6XJ.

Telephone: 01926 621261. Website: www.nrm.org.uk

Home of D200 and several other modern exhibits.

'Locomotion', the National Railway Museum at Shildon , Shildon, County Durham, DL4 1PQ. Telephone: 01388 777999. Website:

www.nrm.org.uk/PlanaVisit/

[VisitShildon.aspx](http://www.nrm.org.uk/PlanaVisit/VisitShildon.aspx)

Includes the APT-E.

HERITAGE RAILWAYS

A number of Britain's heritage railways feature diesel locomotives built in the 1950s and '60s. For more details, see the Heritage Railway Association website: www.heritagerailways.com

Of particular interest are:

Bo'ness and Kinneil Railway , The Scottish Railway Preservation Society, Bo'ness Station, Union Street, Bo'ness, West Lothian, EH51 9AQ.

Telephone: 01506 822298.

Website: www.srps.org.uk/railway

Home to a large collection of diesel power common to Scotland.

Great Central Railway , Loughborough, Leicestershire, LE11 1RW. Telephone: 01509 230726.

Website: www.gcrailway.co.uk

The only double track heritage line in Britain.

Llangollen Railway , The Station, Abbey Road, Llangollen, Denbighshire, LL20 8SN. Telephone: 01978 860979.

Website: www.llangollen-railway.co.uk

Operates a variety of diesel locomotives, along with several 'first generation' diesel multiple units.

The Midland Railway , Butterley Station, Ripley, Derbyshire, DE5 3QZ. Telephone: 01773 747674.

Website: www.midlandrailway-butterley.co.uk

The Midland Railway Trust's large collection includes many diesel locomotives from the BR era.

North Yorkshire Moors Railway , 12 Park Street, Pickering, North Yorkshire, YO18 7AJ. Telephone: 01751 472508.

Website: www.nymr.co.uk

Offers occasional 'diesel galas'.

Swanage Railway , Station House, Railway Station Approach, Swanage, Dorset, BH19 1HB. Telephone: 01929 425800.

Website: www.swanagerailway.co.uk

Offers occasional 'diesel galas'.

West Somerset Railway , The Railway Station, Minehead, Somerset, TA24 5BG. Telephone: 01643 704996.

Website: www.west-somerset-railway.co.uk

26-mile heritage line through the Quantocks.

COVER IMAGE

'Deltic' 9019 *Royal Highland Fusilier* entered service in 1961 and saw twenty years' service. It was later bought by the Deltic Preservation Trust and regularly appears at open days and diesel galas. (courtesy of Martin Hart)

TITLE PAGE IMAGE

When this photograph was taken in April 1965, no. 7813 *Freshford Manor* was one month from withdrawal. No one knew then that D7058 would also be gone six years later.

CONTENTS PAGE IMAGE

By 1969, state-of-the-art locomotive technology looked like this: the English Electric Class 50, a design intended principally for Anglo-Scottish passenger work.

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