

WILTSHIRE WISDOM

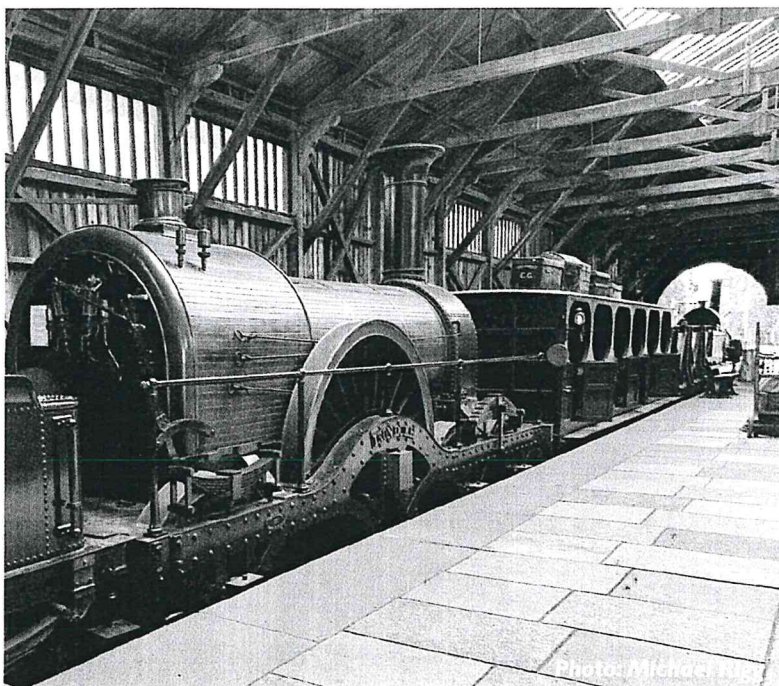
THE GENIUS OF SWINDON IN THE STEAM AGE

by Bob Meanley

a book review by Philip Atkins

Incorporated in 1835, the Great Western Railway existed as a legal entity for 112 years, during which it became a national institution. More than seven thousand steam locomotives of GWR design were built, around 80 per cent of these at Swindon Works, with the final examples not appearing until after nationalisation, and the last as late as 1956. Whilst each and every one of these has been individually tabulated by the Railway Correspondence & Travel Society over the course of many years, this remarkable book, tracing GWR steam locomotive development, has been written by a professional steam plant engineer, and more recently a leading figure in (especially former GWR) locomotive restoration and operation. It provides a fascinating overview of the process via insightful new perspectives, and has been researched with great diligence with reference to extensive still surviving primary records.

To the author's credit he identifies numerous individuals, who were involved along the way, other than the merely half dozen worthies who successively headed the GWR locomotive department between the 1840s and the 1940s. He also links certain developments, that resulted from contemporary external factors, particularly economic, over which the Company had no control. Who would have thought, for instance, that the price of American wheat should have influenced the low scheduled maximum speed of 40mph by GWR trains in the 1870s?



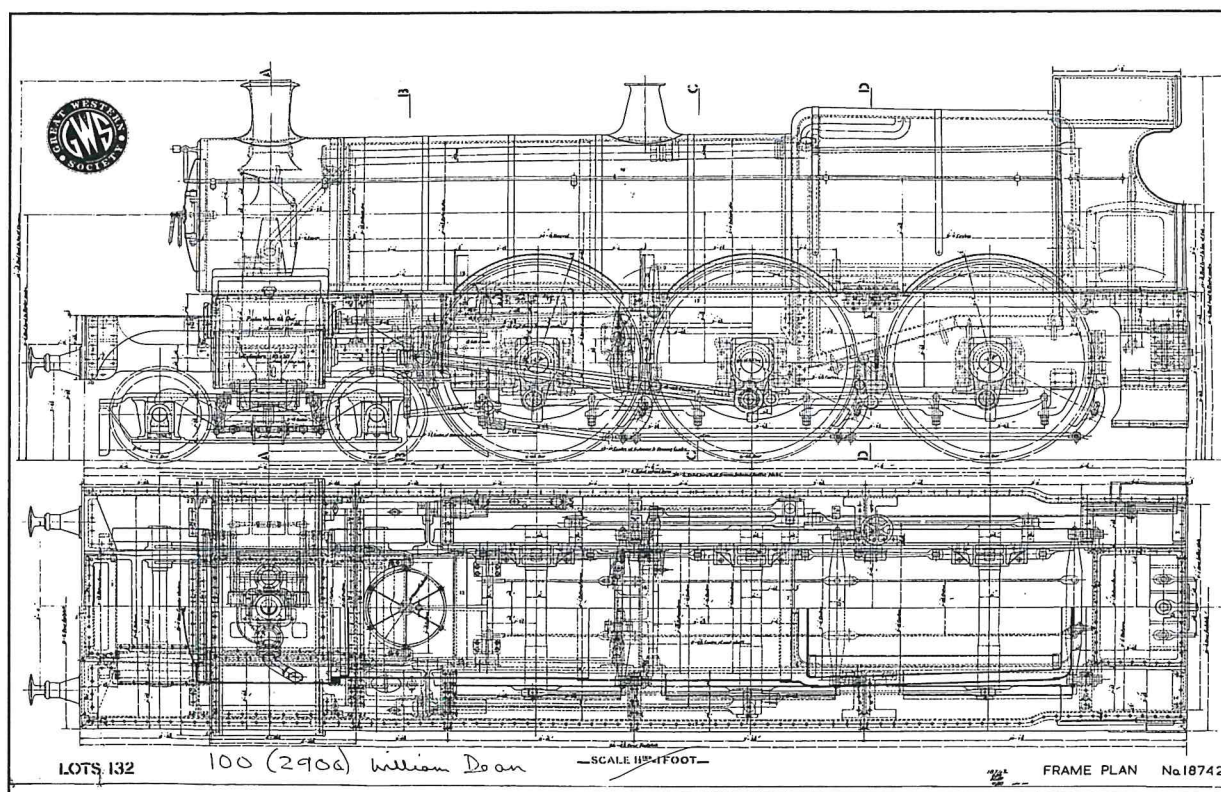
National Collection 1985 4-2-2 broad gauge
Iron Duke replica at Didcot, July 2026

Wiltshire Wisdom is indeed a very apt title, although it has to be admitted that the term was somewhat mischievously used by certain of the GWR's contemporaries, reflecting its long tendency to do many things differently. Not the least of these was its initial adoption of I K Brunel's 7ft Broad Gauge, the locomotives for which, and the 'Gauge War', the author describes very adroitly.

Brunel died in September 1859, and the gradual conversion to Narrow Gauge (Standard Gauge to everyone else) began very soon afterwards in 1860. The Broad Gauge was undoubtedly epitomised by Daniel Gooch's sturdy 4-2-2s, first introduced in 1847, yet quite remarkably, the last true BG engines to be built, under William Dean, were three essentially similar brand new 4-2-2s as late as 1888. This was the first of several instances of the GWR falling back on a very old locomotive design. Furthermore, this was only four years before the complete elimination of the Broad Gauge was finally achieved in May 1892, an event which resulted in the near simultaneous redundancy of about 140 locomotives that were thereupon dumped en masse at Swindon.

Equally surprising was the construction by William Dean of eight (initially) rather ugly 'gauge convertible' 2-2-2s at Swindon in mid-1891, which could only have worked on the 7ft gauge for a matter of months before their anticipated subsequent conversion. The necessary provision of leading bogies on these a little later on would actually then result in one of the most elegant British locomotive designs of all time! More engines were built to this final 4-2-2 configuration until 1898, bringing the total to eighty. However, these would all very soon become outclassed by increasing train loadings, and their proposed conversion to become 4-4-0s on investigation did not prove feasible.

William Dean retired in mid-1902 after no less than 25 years in high office, but changes were clearly already afoot before his hitherto deputy since 1897, George Churchward, took over. The Belpaire firebox first appeared on the GWR fitted to a double-framed 4-4-0 in 1898, but far more revolutionary was an outside cylinder express passenger 4-6-0, numbered 100, in February 1902 and therefore by tradition attributed to William Dean. Swindon's first taper boiler application was made to another 4-4-0 in September 1902.



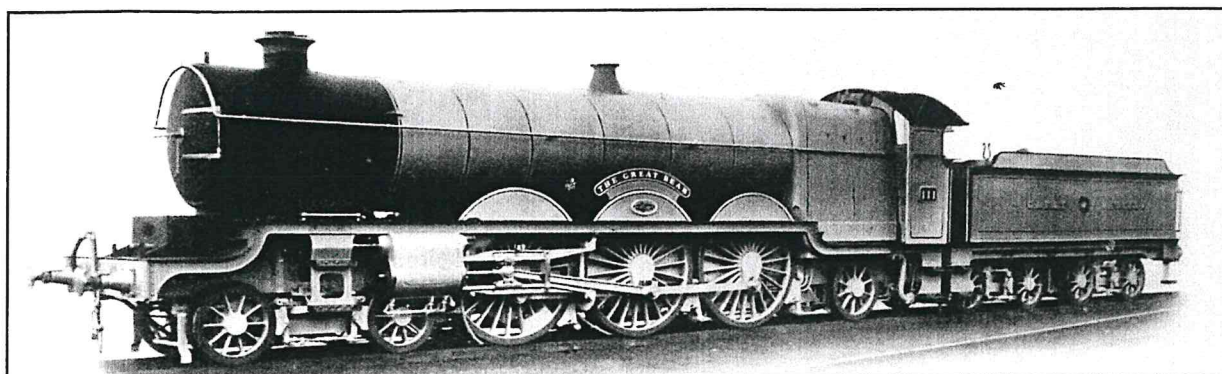
Pioneer Dean/Churchward 4-6-0 No 100 frame plan

Meanwhile a second 4-6-0, No. 98, swiftly followed in March 1903. Compared to No. 100 this was also provided with a large but more sophisticated taper boiler, and also greatly improved current American style cylinders, in order to accommodate large diameter long lap/long travel piston valves. On these two counts GWR No. 98, at a stroke established an overall format that remained, with the later addition of superheating, right up to the last 'Hall' class 4-6-0s, that were built 'posthumously' at Swindon nearly fifty years later.

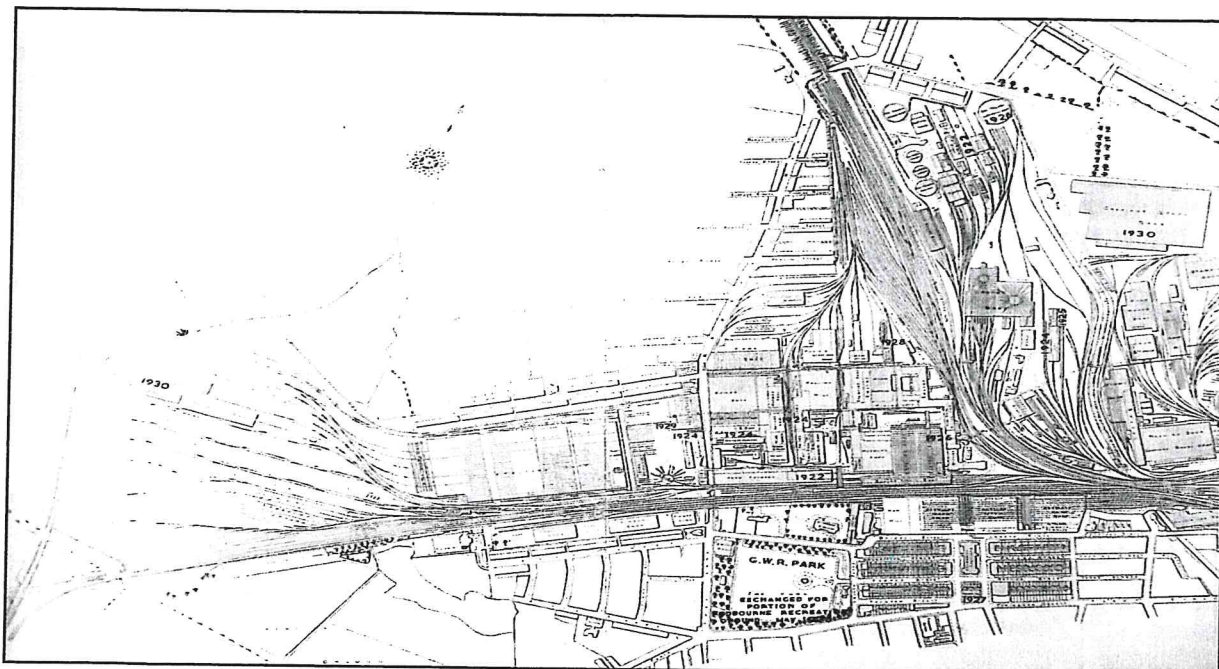
For good measure, the next six months also witnessed the debut of the similarly styled prototype Churchward 2-8-0, No. 97 and large 2-6-2 tank No. 99, both types that would also continue to be built, albeit with inevitable modifications, well into the 1940s. Rather short lived by comparison were the 4-4-0 and 4-4-2T, that became extinct as early as 1933/34. Despite the introduction of the former in 1904 Swindon still continued to build

inside-cylinder 4-4-0s with double frames, albeit with modern taper boilers, until 1910. All five of the projected designs mentioned above, together with another proposed 4-6-0 having 5ft 8in coupled wheels for service in the West Country, had been drafted in very skeletal diagram form in January 1901, and thereby coincident with the death of Queen Victoria.

On the other hand, Churchward's very popular mixed traffic 2-6-0 with 5ft 8in coupled wheels was not conceived until 1910, by which time superheating had become standard practice on the GWR. Some six months earlier another 'added extra', also superheated, but lacking top feed when first built, was his prototype 2-8-0T for the South Wales coal traffic, which was then still steadily increasing year on year. Both types were built in large numbers over a long period, the 2-6-0 peak² ing at no less than 342 units between 1932 and 1935.



Official portrait of GWR 4-6-2 No 111 The Great Bear, when new in 1908



Swindon Works plan, 1930

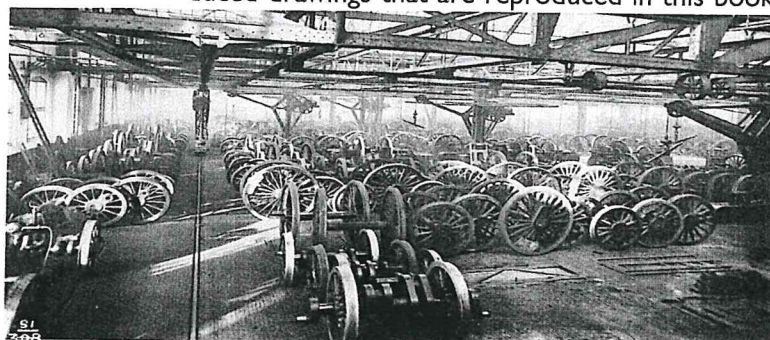
Churchward looms very large in this book, which contains numerous verbatim extracts from his various papers and reports. He attached considerable importance to boilers, which he proceeded to standardise. Following the early experimental purchase by the GWR of three de Glehn 4-cylinder compound 4-4-2s from France, and comparing otherwise very similar 4-4-2 and 4-6-0 engines of his own design in traffic, between 1906 and 1914 he built annual batches of simple expansion 2-cylinder (Saint) and 4-cylinder (Star) 4-6-0s, usually alternately. However, the mystery as to just why No. 111 *The Great Bear*, in effect a super Star with wide firebox, and Britain's first 4-6-2 by no less than 14 years, was built by the GWR in 1908, still remains unexplained, although it is naturally described and discussed at some length.

Outwardly, at the time this period must have appeared to be a golden age at Swindon. The author reveals in some detail, however, that in fact it witnessed several years of ongoing bitter conflict between Churchward and the GWR's general manager, Sir James Inglis, who had formerly been its chief engineer. This concerned the manner in which new locomotives were funded, at a time after the 'boom' year of 1906, when working expenses were increasing faster than the resultant revenue. The dispute ended only with Inglis' death in office in 1911, at the age of sixty.

At the beginning of the twentieth century the erecting shop facilities at Swindon were considerably extended, not only for the construction of larger engines, but also for the routine repair of the existing stock. Such infrastructure developments at Swindon are described in some detail here, together with its associated heavy equipment, some of which was enterprisingly fabricated within the Works itself. The book

is also indeed very much a history of the evolution of Swindon Works, as well as its products and personalities. It is replete with numerous dated photographs of it, both inside and out. The text is laced with fascinating minutiae. For example, it was decided c.1913 to discontinue fitting works plates to new locomotives, surely a sad omission on any locomotive, in order to save brass. Perhaps instead their build date could have been incorporated on the traditional number plates which, like Swindon's trademark safety valve bonnets, would still continue to be produced unabated for many years yet to come.

Swindon Works was sorely pressed by the exigencies of World War I, when it was called upon to undertake much work for the government relating to the manufacture of munitions, in addition to ongoing routine, albeit somewhat reduced new locomotive construction and repairs. After 1918 it took nearly five years to fully recover from accumulated arrears in both fields. Yet as early as May 1919 Swindon turned out a prototype mixed traffic 2-8-0, No. 4700, temporarily fitted with a standard No. 1 taper boiler, while a larger one specially for it was still under design. The 'frame plan', Swindon parlance for general arrangement drawing, for this engine is but one of several such exquisitely produced drawings that are reproduced in this book.



AW Wheel Shop with wheels galore

On the strength of the 2-6-0s this development, by going one coupled axle better, had been specifically requested by the Traffic Department.

Eight more production engines later followed during 1921-22. These were fitted from new with the larger No. 7 boiler, and were distinguished by having outside steam pipes to the cylinders, a novelty attributed to one William Stanier, then assistant works manager. These would be the only British eight-coupled mixed traffic engines ever built, despite more later being requested in vain. Although the No. 7 boiler remained confined to the 4700 class, these nine engines were still considered to be worthy of all being provided with new boilers as late as the 1950s.

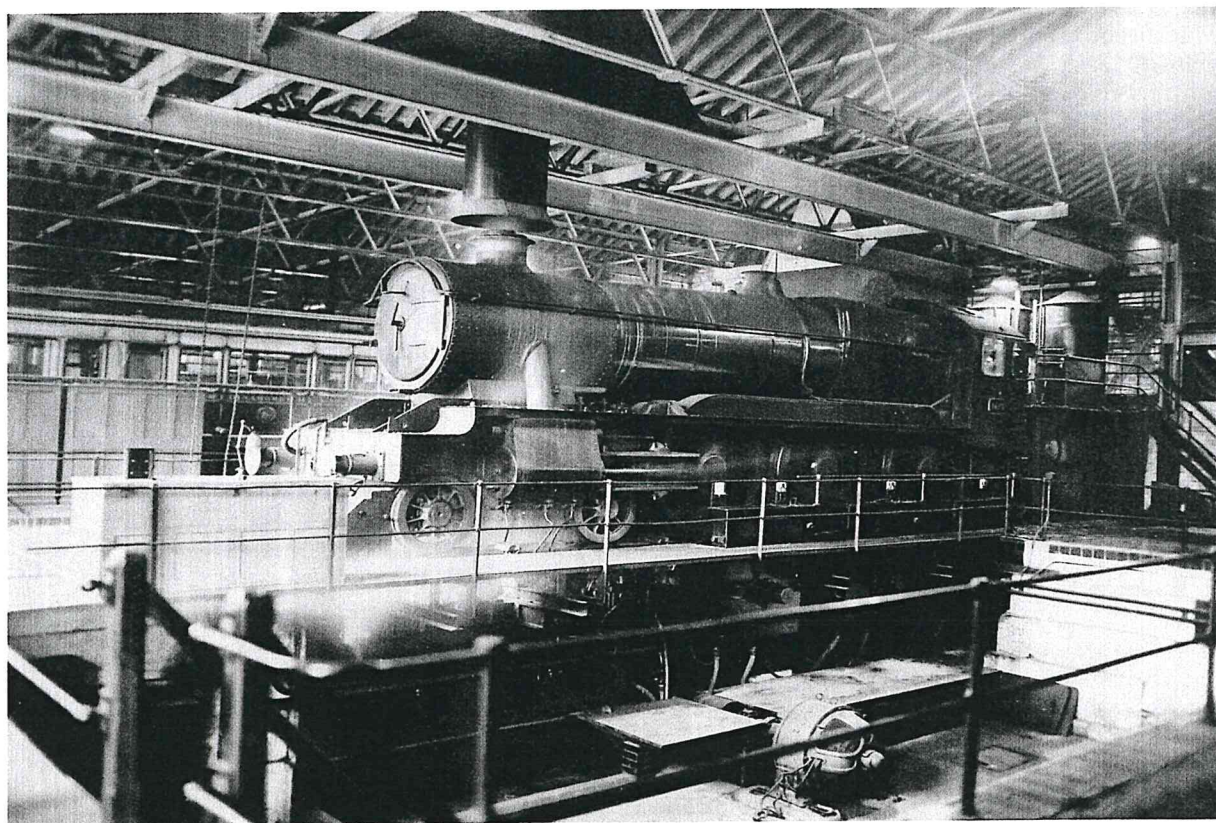
Churchward retired on the last day of 1921, to be succeeded as CME by his erstwhile works manager, Charles Collett, a man of very different personality and a somewhat elusive character. The extent of his overall responsibilities, listed on p. 161, were breathtaking, including almost 46,000 staff, and extended far beyond Swindon itself.

Collett stayed close to Churchward's established principles in regard to locomotive design. He very soon initiated design work on an enlarged 'Star', the thence seemingly perennial 'Castle' class in 1923. This was further expanded within the limits of the GWR loading gauge and the newly permitted increase in the maximum permitted coupled axle load of 22.5 tons (which covertly was almost certainly significantly exceeded) only four years later in the 'King' class in 1927.

While Collett did not seek to develop the 'Saint' class in a comparable manner, a master stroke was his rebuilding in 1924 of No. 2925 *Saint Martin* with 6ft diameter coupled wheels. A seemingly relatively simple operation, this nevertheless took five months, which is described in some detail. The transformation was initially envisaged for passenger service in the West Country. However, after nearly four years evaluation in traffic, production began in 1928 of the newly designated 'Hall' class for mixed traffic duties system wide. Ultimately a total 330 of these 4-6-0s would be built up to 1950.

Collett later produced two more mixed traffic 4-6-0 classes effectively on the cheap, by randomly withdrawing one hundred of the older Churchward 2-6-0s from 1936. Their 5ft 8in coupled wheels, motion, and tenders were salvaged, although not the cylinders, which were re-designed and credited by many to have given the eighty resulting 'Granges' the edge on the 'Halls'. (Both classes shared the Standard No. 1 taper boiler.) A rather smaller boiler was also newly designed to produce the mechanically otherwise very similar 'Manor' class, intended for service on weight restricted routes. Because of the war no further proposed conversions of the remaining 242 2-6-0s ever took place, although ten new 'Manors' were later built in 1950.

Collett developed other Churchward classes in different ways, for example elongating his 2-8-0Ts into 2-8-2Ts, with unusually large coal bunkers for



Hawksworth County 4-6-0 on Swindon test plant

a tank locomotive, with the capacity for 6 tons of coal. This was to increase their sphere of operation, which was by no means confined to South Wales. Somewhat smaller, almost half of the locomotives inherited from the small railways in that region around 1923 were 0-6-2 tank engines. In 1924 Collett produced a more modern successor with superheated taper boiler.

Five years later, from 1929 large numbers of 0-6-0 pannier tanks, closely based on the 'Dean Goods' tender engine in its final Belpaire form, were built until 1950, originally largely to replace life expired 0-6-0 saddle tanks. By way of a direct replacement for these Dean engines themselves on secondary routes, in 1930 Collett evolved the taper boiler 2251 class 0-6-0. Quite surprising for 1932 was a new build update of the Wolverhampton built 517 class 0-4-2T, attributed to Joe Armstrong, and harking back to 1868.

As Collett's deputy until 1931, and only five years his junior, William Stanier might have been considered a likely candidate to succeed him as CME, but in 1932 Stanier was recruited by the LMS as its new CME, and Collett would in the event elect to remain in post until reaching 70 in 1941.

At this very difficult time it was to be Fred Hawksworth, the son of a Swindon draughtsman himself, who had entered the works in 1898, and quickly became a very skilled draughtsman in his own right long before he finally reached the very top. In 1944 he introduced a revision of the 'Hall' class with increased superheat, which was followed by the 'County' 4-6-0 in 1945, of which the first example sported the novelty of a double blastpipe and chimney. Only thirty of these were built, and footplate opinions of them were somewhat mixed. The author attributes this to the class being misconstrued as being an 'improved Castle', rather than in reality more of a 'developed Hall'. Considerable contemporary statistical information is given concerning the unsuccessful experimental provision of oil burning at the government's behest on 37 GWR locomotives in 1947, on account of the prevailing chronic national coal shortages.



GWR/BR 0-6-0PT No 9681 on the Dean Forest Railway, July 2025

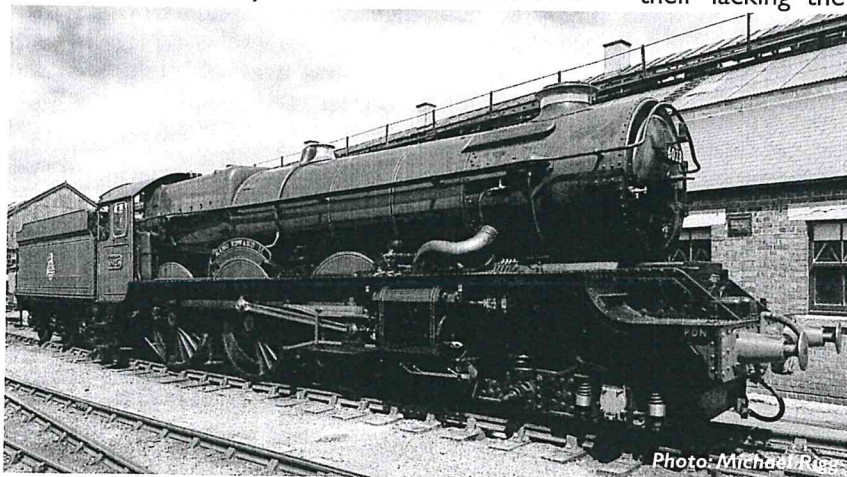
The author addresses the perennial question of the mythical Hawksworth 'Pacific' of 1946, that was consistently denied for many years by the man himself, but who nevertheless evidently finally conceded that some initial design work had indeed been undertaken for it. Notwithstanding a rather surprising close friendship between himself and Oliver Bulleid, Hawksworth was apparently bitter that although government permission had been somewhat reluctantly granted to the Southern Railway to build the 'Merchant Navy' 4-6-2s during the war, such was later withheld from the GWR immediately after it.

Also of some interest is the rational explanation given for the rather puzzling ordering in December 1947 by the GWR of a total of no less than 200 9400 class 0-6-0 pannier tanks with taper boilers, from several private locomotive builders. The last of these would not be delivered until all but nine years later, in October 1956, only two years before withdrawal commenced with an example that was but four years old. Radical changes in traffic patterns and industry during the unusually protracted construction period were partly to blame. Likewise, regarding the seventy light 1600 class 0-6-0PTs, whose design origins actually dated back to 1876, yet introduced post-GWR in 1949, although the final twenty of these had been authorised as late as 1953, their retirement also began in 1958.

Commendably, this book does not abruptly terminate with the demise of the GWR as such in December 1947, nor does it confine itself purely to steam locomotive matters. Due attention is given to pre-war experiments with diesel shunters, and the two gas turbine locomotives boldly ordered in 1946 by the GWR from Brown Boveri in Switzerland, and Metrovick in Manchester, which were not delivered until 1950 and 1952 respectively, but with no follow up. The author notes that Hawksworth had shown an interest in turbines in principle in the 1920s, as also did his erstwhile colleague William Stanier a little later, on the LMS. By the end of the war Stanier became a director of Power Jets Ltd, whom he suggests may well also have had some unspecified involvement with this radical experiment.

Commencing in 1951, Swindon Works built 198 of the 999 British Railways Standard steam locomotives. These included all eighty of the Class 4 4-6-0s (designed at Brighton), and the twenty Class 3 2-6-0s and their 45 2-6-2 tank equivalents, for both of which Swindon had overall design responsibility. As a consequence, their boilers were directly derived from the No. 2 taper design that had originated at Swindon almost fifty years earlier. The balance consisted of 53 Class 9F 2-10-0s. Of these the final eighteen, that were essentially all built during 1959 at a unit cost of £33,500, culminated with the especially green-painted No. 92220 *Evening Star* that was outshopped early the following year. The last steam locomotives to enter service on British Railways, this batch was fated to enjoy an average service life of only 7 years 9 months.

Following the public announcement of the British Railways Modernisation and Re-equipment plan in January 1955, the first main line diesel locomotive would arrive on the Western Region precisely three years later. However, the five years, 1957 to 1961, witnessed a memorable Indian Summer performance-wise for (Great) Western steam power, before its effective elimination at the end of a mere further four years on 31 December 1965.



No 6023 King Edward II at Didcot Railway Centre, June 2026

Many 'Castles' were rejuvenated with new high superheat boilers, that continued to be constructed until 1961, while a number, like all thirty 'Kings', were further fortified with double blast-pipes and chimneys from 1956. The author considers that the latter, that had all been heavily renewed during the 1950s, were worked harder than ever during their twilight years, prior to their abrupt extinction in 1962, during which several had nevertheless still undergone expensive heavy general repairs! He presents a very interesting detailed statistical analysis of withdrawals, GWR class by class, from January 1 1960, when 24 classes aggregated 2828 engines. Whereas of these only 393 locomotives were routinely withdrawn during 1960-61, no less than 1158 went during 1962-63, followed by 1246 during 1964-65.

The author laments this appalling waste of resources, and ponders as to what was its actual economic justification. Such was indeed also deplored by many railwaymen at the time, who had expected another five years' grace for steam until 1970 at the very least. He suggests it was almost certainly linked to the appointment of Stanley Raymond as VWR general manager in late 1961 (in succession to Keith Grand, a celebrated dyed in the wool former GWR man, who in 1953 had even unsuccessfully petitioned to build more 2800 class 2-8-0s in lieu of the forthcoming 9Fs). Raymond was evidently determined to make the Western the first steam free region on BR. However, a very similar scenario also prevailed at the same time on the Eastern Region, which said fare-

well to steam working only a few months later than the WR during April 1966.

To supersede a number of their illustrious steam forebears, the Western Region, in 1955 when under Keith Grand, with typical GWR idiosyncrasy opted for diesel hydraulic instead of diesel electric locomotives. This was with regard to their inherent higher power to weight ratio, as a result of their lacking the encumbrance of electric generators and traction motors, not to mention the additional maintenance associated with these components. A total of 308 such main line locomotives, comprised of five different classes, entered service on the WR between January 1958 and July 1964. In 1965 BR decided to standardise completely thereafter on diesel electric designs, and the above locomotives were all prematurely retired between December 1967 and February 1977. The first 'Western' class C-Cs, that were built quite soon after the

last 9Fs, by comparison were costed at £115,000 each, and had an average working life of around twelve years. Therefore, their annual depreciation rate would have been at least double that of the final 9Fs.

Given that the humble inside-cylinder 0-6-0 tank engine was the predominant locomotive type on the GWR for very many years, it was somewhat appropriate that the last new locomotives to be built at Swindon Works for the Western Region were the BR Class 14 0-6-0 diesel hydraulics. 56 of these were built during 1964-65, only to be retired between 1968 and 1970, one might also say in the latter day 1600 and 9400 class tradition!



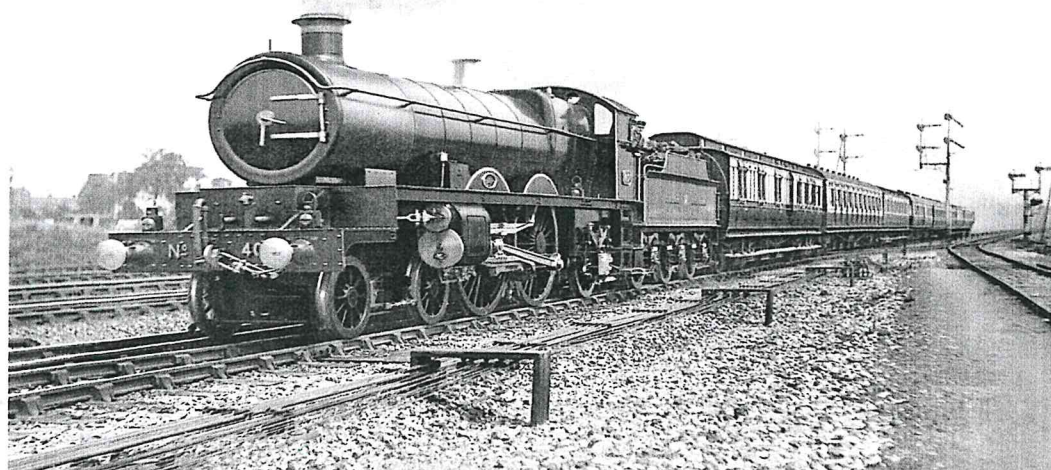
National Collection 1963 BR Class 52 diesel-hydraulic C-C No 1023 Western Fusilier at Didcot Railway Centre, June 2026

This book is a monumental piece of work, produced to an extremely high standard, and very well written. It weighs no less than 6lb, and the author signs off the main text by advising the reader, in the interests of health & safety, not to drop a copy on their toes! At £75 it is undeniably expensive, but running to precisely 400 pages, in relation to many other publications, pro rata it is well worth every penny.



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Bob Meanley



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A bittersweet image of 60007 Sir Nigel Gresley, holder of the post-war speed record of 112mph, posing proudly outside E2 shop in Doncaster Works, where it and 60103 Flying Scotsman were 'born' in 1937 and 1923 respectively.

This was the last day of the 'Celebration of Doncaster Works' (the 'Plant') before its complete closure.

Photo: Michael Rigg

