BRITISH STEAM

GWR COLLETT CASTLE CLASS

KEITH LANGSTON

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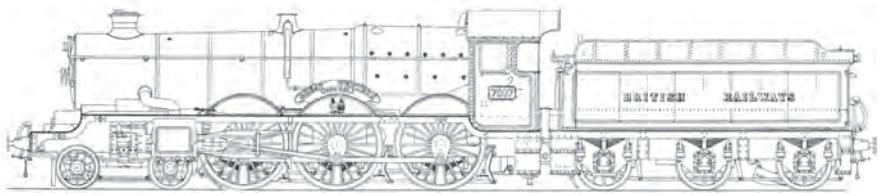
CONTENTS



Every effort has been made in respect of ensuring that the information given is as accurate as possible regarding the details concerning locomotive withdrawal, double chimney fitting and the dates and locations of final disposal, in respect of the 171 'Castle' class engines. However, some of the previously published records do contain very minor variations in that regard, and they were understandably difficult to conclusively resolve, given the obvious passage of time.

ACKNOWLEDGEMENTS

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Additional editorial material and specific images were supplied by my good friends David Anderson and John Chalcraft, whose encouragement and shared railway knowledge was invaluable. The additional inclusion of images from the collections of a great many accomplished photographers, past and present, help to tell the 'Castle' class story. The publication of those images serves as a lasting tribute to their skills.

Keith Langston 2015

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Further Research

Over many years the popular Collett 'Castle' class locomotives have featured in books and magazine articles, and now in the 21st century information is additionally available via the World Wide Web. Further research about the class can be undertaken by consulting these titles, and indeed others:

'Castles' and 'Kings' at Work – Michael Rutherford; Ian Allan Publishing 1982
Portraits of 'Castles' – Bryan Holden and Kenneth Leech; Moorland 1981
The Power of the 'Castles' – R.C Riley & Peter Walker; Oxford Publishing Co 2003
British Steam – 'Castles & Kings' – Keith Langston; Morton's Media 2010

Amongst the many websites available with 'Castle' class content are:
The Great Western Society – www.gwsmainline.org/
Tyseley Locomotive Works – www.tyseleylocoworks.co.uk/tlw/
Steam-Museum of the Great Western Railway – www.steam-museum.org.uk
Rail Info UK – www.railuk.info/steam/
BRDatabase – www.brdatabase.info/

FOREWORD

The Collett 'Castles' were the principal passenger locomotive class of the Great Western Railway and could be found working throughout the system, from top link expresses to more humble secondary services and often on fast fitted freight trains.

They were developed from Churchward's 1906 designed 4-cylinder 'Star' class 4-6-0s to cope with the company's then ever increasing volume of traffic; 155 'Castles' were built in batches between 1923 and 1950, whilst a further 15 'Star' class engines were rebuilt as 'Castles' at differing times. Famously GWR's only Pacific 'THE GREAT BEAR' was rebuilt as a 'Castle' when its boiler became due for replacement. In total 171 Collett 'Castle' class locomotive were built, all at Swindon Works.

Despite the long period of delivery, development did not stand still with improvements to the design being regularly made during the years of construction and thereafter throughout the post-nationalisation period. New boilers, fitted with Double Chimneys, were still being built in the early 1960s and but for the hasty demise of steam it is likely that the 'Castles' would have been capable of giving many more years service, in what became known as their 'final modified form'. It is fortunate that amongst the 8 Castles which have survived, there are examples of most major stages of development including No 4073 CAERPHILLY CASTLE and No 4079 PENDENNIS CASTLE, both of which are preserved in their originally introduced form.

A number of the early 'Castles' completed approximately 40 years in traffic with several clocking up a little short of 2 million miles, the outstanding example being rebuilt 'Star' class engine No 4037 THE SOUTH WALES BORDERERS, which ran a remarkable 2,429,722 miles between 1910 and 1962.

In this book, Keith Langston provides biographical details about the 'Castle' class designer Charles Benjamin Collett together with the basic history of each individual locomotive's working life. There are over 300 images included, providing a comprehensive photographic record of the class. To complete the 'Castle' story background information on the subject names which the engines carried is also included. This publication is a fact-packed reference book which will appeal to steam enthusiasts in general and in particular to those with a special interest in Great Western Railway (GWR) locomotives.

Richard Croucher Chairman
Great Western Society,
Didcot Railway Centre,
Oxon.
www.didcotrailwaycentre.org.uk/
June 2014

Preserved GWR Collett 'Castle' class 4-6-0 No 4079 PENDENNIS CASTLE is seen in Didcot shed yards prior to working a 1967 'Birkenhead Flyer' railtour. ***David Anderson***

In 2015 the return to steam of No 4079 PENDENNIS CASTLE was an ongoing work in progress, after the 1924 Swindon built 'Castle' was returned to the UK from Australia.

For further information on the project, or to make an offer of support please contact The Great Western Society, Didcot Railway Centre, Didcot, Oxfordshire, OX11 7NJ, England.

Tel: +44 (0) 1235 817200 or e-mail info@didcotrailwaycentre.org.uk

Chapter 1

INTRODUCTION

Castle Builder – Charles Benjamin Collett O.B.E.

In 1948 British Railways inherited some 2,288 locomotives which could be directly attributed to Charles Benjamin Collett O.B.E., almost 60% of the ex Great Western Railway total. Collett served the Great Western Railway (GWR) for the majority of his working life finally becoming Chief Mechanical Engineer (CME) of that organisation in 1922, a position which he held until his retirement in 1941. Prominent amongst his designs were the highly successful 4-cylinder 4-6-0 'Castle' class locomotives.

What follows does not purport to be a comprehensively detailed engineering-based study of the GWR 'Castle' class engines, but more a general appreciation of Collett's '4073' class during their period in service with both the GWR and British Railways Western Region. Main changes in design are highlighted as are the range of modifications in general and in particular those which depict changes in external condition between one 'Castle' locomotive and another. But first what of the man, C.B. Collett?

C.B. Collett 1871–1952. *BR*

Churchward's Heir Apparent

It is a generally held belief that Collett was an 'improver' of designs attributed to his predecessor George Jackson Churchward, indeed many considered Collett's predecessor to be the greatest of all the GWR locomotive builders. Perhaps in the full sense of the word Collett was not strictly speaking a locomotive designer, but he was undoubtedly an accomplished engineer and administrator who was well respected for his organisational abilities.

The son of a journalist, Collett was born at Paddington, London in 1871 and his formal education was at Merchant Taylors School, London and the City and Guilds College. Leaving university he went to work as an engineering pupil for Maudsley, Son & Field Ltd of Lambeth, London an established company of marine engine builders. In 1893 at the age of 22 Collett entered the hallowed portals of the GWR's Swindon Works for the first time.

Noticed as being a diligent and methodical worker he served as a junior draughtsman until 1898 when he was appointed to the position of Assistant to the Chief Draughtsman. Collett's first senior position was that of Technical Inspector Swindon Works, a post he held for just over a year. Appointed to the post of Assistant Works Manager, Swindon in 1901 Collett's not inconsiderable engineering abilities cannot have failed to come to the attention of one G. J. Churchward who was at that time Chief Assistant to the then GWR Locomotive Superintendent William Dean.

Collett served in senior positions under the aforementioned GWR locomotive engineers. He would have greatly profited from the experience he gained during his 20 years under Churchward, who was GWR Locomotive Superintendent (1902–1916) and then Chief Mechanical Engineer (1916–1921). In 1912 Collett was appointed to the post of Works Manager, Swindon. Over time it became obvious to many observers that Collett was being groomed to succeed Churchward.

Colleagues

It is interesting to note that amongst his colleagues during progress through the GWR engineering ranks was another young engineer, one William A. Stanier, later of LMS fame. Stanier joined the GWR as an apprentice in 1892 and in 1906 (during Collett's spell as Assistant Works Manager, Swindon) Stanier became Assistant to the Works Manager Swindon. In 1912 Stanier became Assistant Works Manager, Swindon as Collett became Works Manager, Swindon.

Stanier's career continued to track that of Collett and in 1922 when the latter was appointed Great Western Railway Chief Mechanical Engineer Stanier became Principal Assistant to the CME. Stanier, then aged 56 left the GWR for pastures new in 1932 after he had deduced that the signalled continuance 'in post' of Collett (then aged 61) was blocking his upward move to the CME's office. History proved Stanier to be correct as Collett continued in the job for a further 9 years. Collett and Stanier were both greatly influenced by the work of Churchward and, of course the experience they gained from working under the 'Great Man' at Swindon.

During his formative years Collett did not spend time around running sheds and on locomotive footplates, he was very much a 'works' man, thus the greater part of his later expertise lay in developing engineering practices and improving work flow methods. Before becoming CME he had spent over 20 years working to improve boiler manufacturing to great effect, and additionally rationalising rolling stock and improving locomotive repair facilities.

Great Western folklore would have it that Churchward and Collett were not necessarily the best of friends, but positive proof of that commonly held belief is hard to find. However, what is certain is the fact that they were personality-wise very different people, indeed 'chalk and cheese' would not be a misplaced appraisal of the diverse personae of the two GWR engineers. The two men did, without doubt, make a formidable team, furthermore Churchward's standard locomotive designs suited the GWR and accordingly Collett was the perfect choice of engineer to bring into being the new and improved production methods needed in order to construct 20th century steam locomotives.

Collett GWR Chief Mechanical Engineer

Churchward was a hard act to follow as he was reportedly an outgoing man with great charisma who ruled with a very firm hand, indeed the word 'domineering' has even been used to describe some aspects of his management style. By comparison Collett was perhaps a milder man and almost certainly less domineering than his predecessor but he was nevertheless a hard task master, who insisted upon top quality work from his staff and demanded their absolute loyalty. However, Collett did gain the reputation of being a very fair man and that aspect of his personality did indeed earn him the respect of colleagues. Collett did not seek to attract friends and his apparent standoffish manner meant that other members of the management team did not seek to closely associate themselves with him, on a personal level.

Soon after his appointment to the post of CME Collett got to work modernising the former Rhymney Railway Caerphilly works which he reorganised and equipped to become the maintenance and repair centre for GWR locomotives and rolling stock allocated to the Welsh valleys. Some 5 years later the workshops at Wolverhampton Stafford Road were upgraded under Collett's supervision in order to maintain all GWR locomotives in the northern area.

Much to the delight of the GWR board of directors the reorganisation of workshops and procedures instigated by Collett led to sizable reductions in manufacturing costs. Of great importance was the development of techniques associated with the optical alignment of locomotive frames, cylinders and motion using equipment supplied by the famous Zeiss Company. Swindon claimed that employing such meticulous practices turned steam locomotives into precision machines. Recorded improved 'in traffic' performances validated that claim. Collett also continued the expansion of the GWR Automatic Train Control system (ATC), which during his time was installed on almost all of the company's important routes.

Rolling Stock

Collett was associated with other GWR landmark decisions not least of which the introduction of the Laycock buckeye coupler, a move which greatly benefited the company. He also worked at improving coaching stock, and whilst his 1925 articulated suburban stock may have invited a degree of criticism other innovations and improvements were judged to be highly successful, notably his 1931 Super Saloons and 1935 Centenary coaches. We should also remember that Collett reintroduced the popular chocolate and cream livery for coaching stock.

Starting with the premise that good bogie design is paramount to the 'ride quality' of a passenger coach Collett carried out novel tests using a 7 coach consist which became known as the 'Whitewash Train'. In short each coach incorporated differently designed bogies, and in each vehicle the toilet flush box was filled with different coloured shades of colourwash. Observers, if that is the word, were posted in each WC cubicle and instructed to release wash whenever a bad lurch was experienced. Thereafter the resultant rainbow of colours observed on the ballast would indicate which bogie reacted to a particular track defect etc. Of course if all the colours had been released at one point then perchance the track was itself in need of repair! The concept of the 'Whitewash Train' was a far cry from the precision of the Zeiss Optical frame alignment system! But reportedly it was nevertheless effective.

A private man

Tragedy struck in Collett's personal life when in 1923 Ethelwyn May, his wife of 10 years standing, became seriously ill and unexpectedly died. His wife's untimely death engendered in him an interest in esoteric medicine and a linked belief in the value of dietary remedies. Indeed by employing such methods he claimed to have overcome a cancerous related illness of his own, not long after his wife's death. Always a private man, thereafter Collett became even more so, and rarely if ever attended works social functions.

Collett received an O.B.E., in 1919 in recognition of his work in the production of munitions during the First World War. There were reportedly many instances of serious friction between Collett and officials of the Ministry of Labour during that period and the whole episode had a marked effect on his future attitude to government officialdom. So much so that when at the onset of World War II the GWR were again asked to make available production facilities for the manufacture of munitions Collett was reluctant to allow such work. His objections were noted by the Paddington board members but overruled. Consequently he asked the GWR board to take note of his concerns as he feared that locomotives and rolling stock would fall into disrepair due to a resultant lack of facilities and materials. Anyone familiar with the appalling state of the railways at the end of that conflict would have to agree that Collett's caution was perfectly understandable.

Collett's name game!

Although variously described as taciturn and not overly blessed with an obvious sense of humour one particular act by Collett surely points to a hidden devilish trait! He had no time for anything which he saw as pomposity in general and in particular that facet of the character of certain directors of the Great Western Railway. A number of the GWR 'great and good' had expressed a desire to have their names carried on company locomotives. Pun certainly intended, as the saying goes 'Every dog must have his day!'

The GWR had taken the decision circa 1936/37 to combine parts of the extremely old 'Duke' and 'Bulldog' classes to form the 'Earl' or as the resultant re-builds became known 'Dukedog' class of engines. First built in the late 19th century to a design by William Dean the aging locomotives were reduced to kits of parts and then reassembled at Swindon to emerge in 1936 as a 'new' class. However even though they were fine engines no amount of re-building could disguise their obvious 19th century appearance, alongside other Swindon products of the era the 'Dukedogs' looked positively ancient.

Preserved 'Dukedog' class 4-4-0 No 9017 is seen at the Llangollen Railway in 2009. ***Keith Langston***

The 'new' engines were all named after earls in order to supposedly show the 'respect' which the company had for the particular directors who had asked for their names to be placed on locomotives, and perchance the titled fraternity in general. On the appointed day the GWR top brass all assembled at Paddington station to witness the arrival of the first 'new' locomotive of the 'Earl' class.

Reports from the time stated that as the mechanically sound, but nevertheless distinctly antiquated looking engine approached the welcoming party 'a deafening silence descended on the group'. Those directors etc whose names were to be allocated to the 'Dukedogs' were not amused! Collett had his moment, perchance exercising a golden opportunity to deflate what he saw as the GWR balloon of pomposity! Maybe he did have a sense of humour after all? Shortly after the Paddington event 20 intended 'Dukedog' names were instead allocated to 'Castle' class locomotives.

Collett – Swindon

Unlike other GWR officials Collett had little truck with civic affairs, but did nominally serve the town of Swindon as a Justice of the Peace from 1921 to 1928 (e.g. Gooch was MP for Cricklade and Deputy Lord Lieutenant of Berkshire whilst Churchward served a spell as Mayor of Swindon). Collett clocked up an amazing total of 48 years at Swindon Works, he retired in July 1941 in his 70th year. Other retired GWR personnel were known to regularly visit the works; not so Collett: upon retirement he virtually severed all links with the company he had served so loyally. His retirement took him to London where he died aged 81 on 5th April 1952. His funeral was from all accounts a modest affair and the attendees included his successor Frederick W. Hawksworth, former colleague Sir William A. Stanier and past GWR General Manager Sir Felix Pole.

Collett Locomotives

The GWR locomotive fleet taken into stock by BR was all the better for Collett's influence. Although most commentators pulled up short of calling Collett personally a great designer, all acknowledged his superb engineering and organisational skills. In line with most CMEs he did not necessarily hold the pencil and set square that turned new ideas into steam locomotive designs, but he firmly controlled the team that did.

Collett's first big impact on the GWR was the introduction of his 4073 'Castle' Class 7P 4-cylinder 4-6-0 locomotives which were all built at Swindon Works between 1923 and 1950. There were 171 Castles built and the total included 15 engines which were re-built from Churchward's 'Star' Class and also the rebuilt GWR Pacific No 111 THE GREAT BEAR.

Churchward's loco No 111 THE GREAT BEAR was the first Pacific locomotive ever 'steamed' in the UK and the only 4-6-2 built by the GWR. Built in 1908 this loco was considered at the time to be the company's flagship engine. The GWR Pacific had a 20ton 9cwt axle load which severely restricted its route availability. In 1924 the Pacific which had been in service for 16 years, was in need of attention and required a new boiler.

Collett decided that it should be rebuilt as a 4-cylinder 4-6-0 'Castle' not as a 4-6-2; not everyone at the GWR agreed with his decision and indeed General Manager Sir Felix Pole personally questioned Collett about it. Justifying his decision on economical grounds Collett pointed out that the engine had steaming problems which would be expensive to cure and being restricted to the London-Bristol route was, according to the CME, 'a liability not an asset'. Other critics of his decision maintained that the 'Castle' option was the easy option and suggested that Collett had missed the chance of using the 'redundant' 4-6-2 as a test bed for a completely new locomotive design.

In 1926 the London Midland and Scottish Railway took loco No 5000 LAUNCESTON CASTLE on loan and the engine was put to work on the West Coast Main Line between London and Carlisle. The locomotive performed well and as a result the LMS are said to have requested the GWR to build a batch of 'Castles' for them to use on their Anglo-Scottish express services. When the GWR declined to accept that order the LMS asked instead for a set of engineering drawings!

That request also fell upon deaf ears but although the LMS did not get the locomotives at that time they did eventually gain the services of a Swindon man who knew all about 'Castles' and 'Kings'! It is interesting to note that William A. Stanier was almost certainly 'looking over Collett's shoulder' during the development of the first 'Castle' class locomotives. Accordingly the GWR influence in Stanier's LMS designs is there for all to see.

It is a fact that 'Castles' were the backbone of GWR and later WR express services for over 40 years. They were as popular with the men who crewed them in the final years of BR steam as they were with the enginemen of the late 1920s. 'Castles' were put in charge of most of the GWR's crack express services in their heyday, and were to be seen equally at home on services to the holiday resorts of the West Country and expresses to South Wales.

In the late 1920s and early 1930s 'Castle' class 4-6-0 engines were in charge of the famous 'Cheltenham Flyer' services which called for the locos to average 66.2 mph, and allowed just 70 minutes to cover the 77.3 miles from Swindon to Paddington. By modern standards that may not seem a tall order but carried out on a daily basis it was an outstanding achievement of the time, for the locomotives and their footplatemen. There were many instances of 'Castle' class locomotives in charge of heavy trains topping the 100 mph mark, even when in their dotage.

The first of the class 4073 'CAERPHILLY CASTLE' was displayed at the 1924 British Empire Exhibition alongside the Gresley Pacific 'Flying Scotsman'.

Britain's Most Powerful Locomotive

At that time the GWR Castle 4-6-0 was the most powerful locomotive in Britain and after visiting the exhibition rival locomotive designer Nigel Gresley was reportedly 'very impressed' with the Collett locomotive. Locomotive 4073 was the first of Collett's new class to enter service; it did so on 23rd August 1923. The 4-cylinder 4-6-0 ran almost 2 million miles in service before being withdrawn in May 1960, and being initially placed on display at the Science Museum London. In 2014 the locomotive was displayed at 'Steam – The Museum of the Great Western Railway'.

When Hawksworth became GWR CME he presided over a continuing 'Castle' building programme. In 1948 BR became the builders of the remaining '4073' Class locomotives on the order books and they built numbers 7012 to 7037 (26 engines) with 7036 'TAUNTON CASTLE' and 7037 'SWINDON' being the last, both completed in August 1950. Withdrawals had started in the same year (amongst the 6 ex 'Star' re-builds) with No 100A1 LLOYDS being the first in March 1950 (formerly 'Star' class No 4009 SHOOTING STAR), the first 'Castle' 'proper' to be scrapped was No 4091 DUDLEY CASTLE (built 1925) withdrawn in January 1959, with 1,691,856 miles on the clock. The last in service was the 1950 built No 7029 'CLUN CASTLE' withdrawn in December 1965.

The first GWR 'Castle' class No 4073 CAERPHILLY CASTLE is a National Collection Engine, and it is pictured as such in 2009. ***Keith Langston Collection***

Collett's Locomotive Legacy

Collett's reign as GWR CME accounted for the design of 15 new locomotive classes which over time resulted in 2,281 new locomotives being built, by both the GWR and British Railways. In the same period he supervised the rebuilding/ improvement of 8 classes of locomotives totalling some 308 engines. A Collett combined total of 2,589 locomotives by any standard can be considered a formidable contribution to British steam locomotive building. As a comparison the great Sir Nigel Gresley was associated with the design and building of 1,621 locomotives, whilst Sir William A. Stanier had 2,431 locomotives attributed to him during his term as a CME.

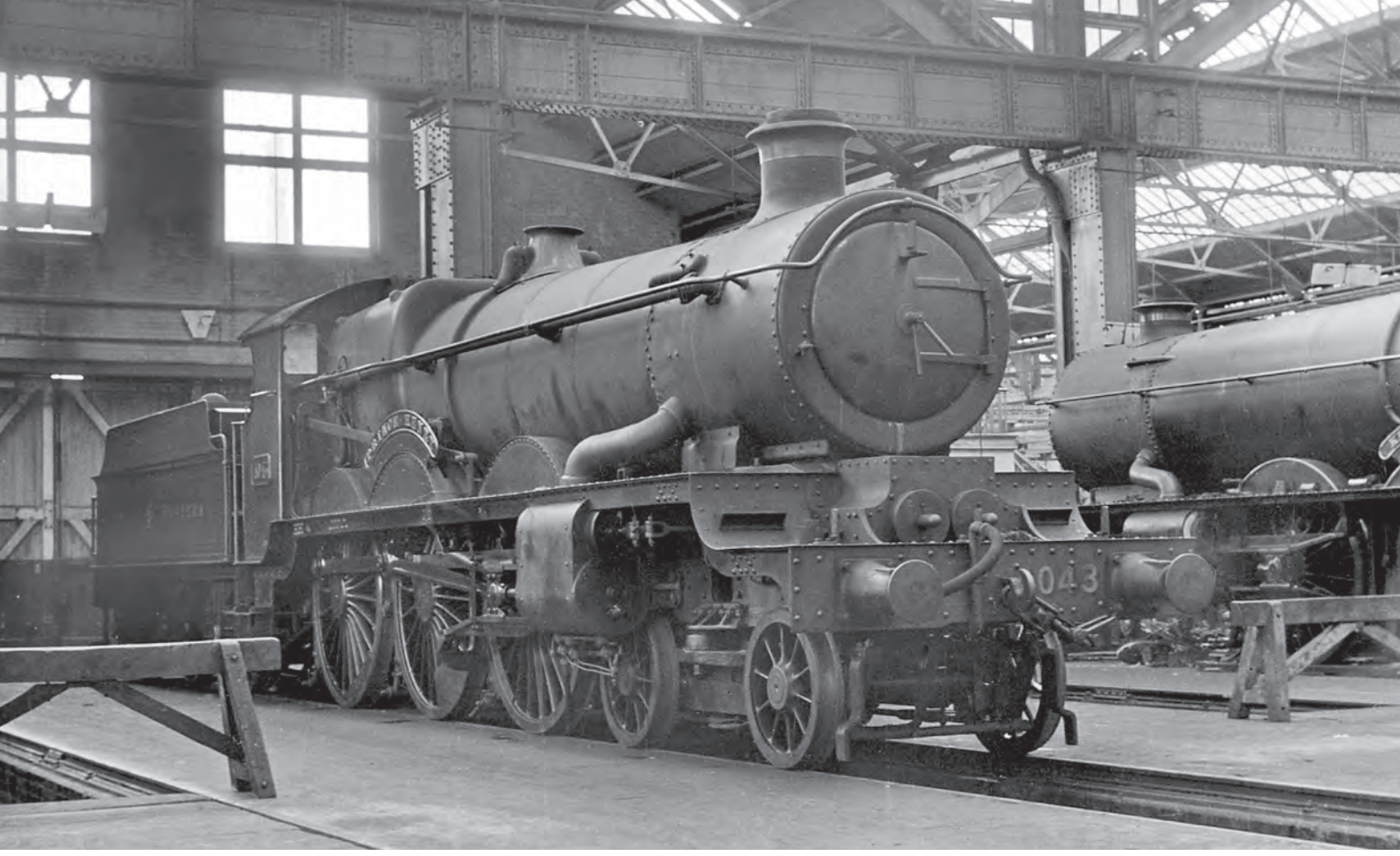
There are a total of 138 preserved ex GWR/BR WR steam locomotives, and given the statistics quoted above it will come as no surprise to readers that 100 of those are from designs/ improvements attributable to one Charles Benjamin Collett O.B.E.(1871–1952). To many younger enthusiasts, who have only experienced GWR locomotive types on preserved railways, the name Collett is simply synonymous with the Great Western Railway!

Preserved 'Castle' class locomotives GWR/BRWR

Number	Name (s)	Introduced	Withdrawn	Status 2014
4073	CAERPHILLY CASTLE	August 1923	May 1960	Static exhibit
4079	PENDENNIS CASTLE	February 1924	May 1964	Under overhaul
5029	NUNNEY CASTLE	May 1934	December 1963	Restored to working order
5043	EARL OF MOUNT EDGCUMBE BARBURY CASTLE (03/36-09/37)	March 1936	December 1963	Restored to working order
5051	EARL BATHURST DRYSLLWYN CASTLE (05/36-08/37)	May 1936	May 1963	Static exhibit
5080	DEFIANT OGMORE CASTLE (05/39-01/41)	May 1939	April 1963	Static exhibit
7027	THORNBURY CASTLE	August 1949	December 1963	Un-restored
7029	CLUN CASTLE	May 1950	December 1965	Under overhaul

The Churchward 'Star' class 4-6-0 locomotives (built Swindon 1906–1923) were reputedly the design which inspired the Collett 'Castle' class 4-6-0 locomotives. The 'Stars' were the first in a long line of successful GWR 4-cylinder express types. There were obvious similarities in the exterior appearance of the two designs.

Preserved GWR 'Castle' class 4-6-0 No 5029 NUNNEY CASTLE is seen on main line duty with a recreated 'The Red Dragon' mainline charter at Acton Turville on 10th November 2001. ***John Chalcraft/Rail Photoprints Collection***



GWR 'Star' class 4-6-0 No 4043 PRINCE HENRY, (built 1913-withdrawn 1952) is seen at Swindon Works in June 1935. ***Rail Photoprints Collection***

GWR 'Star' class 4-6-0 No 4061 GLASTONBURY ABBEY (built 1922-withdrawn 1957) is seen at Gloucester in September 1955, the occasion being the Stephenson Locomotive Society (Midland Area) 'Star' Special which ran between Birmingham Snow Hill and Swindon (return). ***Hugh Ballantyne/Rail Photoprints***

The first 'Castle'

C.B. Collett's first '4073' 'Castle' class 4-cylinder 4-6-0 locomotive No 4073 CAERPHILLY CASTLE was introduced to the public at Paddington Station on 23 August 1923. The new class was initially developed to handle increased traffic and heavier trains on the long non-stop runs between London Paddington and Plymouth. The class was proclaimed by the GWR as being 'Britain's most powerful express passenger locomotives', notwithstanding the fact that the Collett design was seen as a direct development of G.J. Churchward's earlier 'Star' class.

The 'Castle' class was the then new Great Western Railway Chief Mechanical Engineer's first 4-6-0 locomotive. When exhibited at the British Empire Exhibition at Wembley in 1924 it received almost unreserved acclaim. In fact No 4073 was exhibited alongside Gresley's 4-6-2 No 4472 FLYING SCOTSMAN and as a result of which trials between the two types were later held, in which the 'Castle' proved to be the superior engine.

Details of the aforementioned 1925 locomotive trials with the LNER are as follows. Locomotive No 4079 PENDENNIS CASTLE went to the LNER and worked trains on the East Coast Mainline out of Kings Cross. In a direct comparison with Gresley Pacifics No 4475 FLYING FOX and No 2545 DIAMOND JUBILEE, also LNER loco No 4474 VICTOR WILD was temporarily allocated to Old Oak Common depot in order to work 'against' No 4074 CALDICOT CASTLE on the testing Paddington – Plymouth route.

Although during the exchanges all the locomotives concerned performed their allocated tasks with credibility the GWR locomotives were judged to have been the most successful overall when taking into account coal consumption and general performance. In fairness it must be pointed out that the LNER soon after put into practice all the lessons learned from the trials, and their later built Pacifics were the better engines for it.

To celebrate CAERPHILLY CASTLE being placed on display at Wembley a jigsaw puzzle entitled 'Build the Caerphilly Castle' was put on sale by the GWR, and was very favourably received. Any person lucky enough to own one in good condition now has in their possession a very collectable item! To further promote the engine thousands of post card and cigarette card images of No 4073 were produced. Indeed a GWR 1924 publication entitled *A Book of Railway Locomotives for Boys of All Ages* featuring the 'Castle' by W.G. Chapman and priced at 1 shilling (5 new pence), incredibly sold some 60,000 copies in a couple of months (now highly valued as collectors' items).

An unusual pairing as GWR 'Castle' class 4-6-0 No 5029 NUNNEY CASTLE double heads with Standard 'Class 4' 2-6-4T No 80080 on a 'Welsh Marches Express' from Crewe to Worcester. The preserved locomotives are seen climbing to Llanvihangel summit, on 5th April 1994. ***John Chalcraft/Rail Photoprints***

Power personified

The 'Castle' locomotives were in the region of 10% more powerful than the 'Star' class engines and in order to provide that power the cylinders were increased from 15 inch diameter (of the 'Star' class) to 16 inch diameter and additionally the larger 'Swindon Standard 8' boiler was developed. With working boiler pressure maintained at 225lb per square inch the 'Castle' engines could deliver a tractive effort of 31,625lb at 85% boiler pressure against the 'Star's' 27,800lb. Importantly Collett's 4-cylinder 4-6-0 design accommodated within it the maximum 20 ton axle loading (over a 14 foot 9 inch driving wheel base) demanded of him by the then in force GWR permanent way restrictions, compared with the final 'Star' class axle loading of 19.4 tons. Churchward's 'Star' class engines had driving wheels of 6 foot 8 ½ inch diameter, that dimension was also selected by Collett for his 'Castle' class.

In overall dimensions the 'Castle' class locomotives were only 12 inches longer that their predecessors but had a much better appointed cab than the 'Star' engines incorporating side windows and an extended roof, and for the driver and fireman the added luxury of tip up seats! The 'Castles' were very handsome locomotives when turned out of Swindon's famous 'A Shop' in traditional GWR Brunswick Green, with copper topped chimney, polished brass safety valve covers, polished brass splasher beadings, lined out panels and boiler bands.

GWR/BRWR ' Castle' class Build date/Lot number details

Locomotive Numbers	Build Dates	Lot Numbers
4073–4074	1923 August–December	224
4075–4082	1924 January–April	224
4083–4092	1925 May–August	232
4093–4099	1926 May–August	234
5000–5002	1926 September	234
5003–5012	1927 May–July	234
5013–5022	1932 June–August	280
5023–5032	1934 April–May	295
5033–5042	1935 May–July	296
5043–5057	1936 March–June	303
5058–5067	1937 May–August	303
5068–5077	1938 June–August	310
5078–5082	1939 May–June	310
5083–5092	See rebuilds table for dates	317
5093–5097	1939 June	324
5098–5099	1946 May	357
7000–7007	1946 May–July	357
7008–7017	1948 May–August	367
7018–7027	1949 May–August	367
7028–7037	1950 May–August	375

No 5012 BERRY POMEROY CASTLE is seen at Oxford, in July 1961. ***David Anderson***

GWR 'Castle' class 4-6-0 No 5090 NEATH ABBEY, built from 'Star' class No 4070, is seen approaching Bathampton with the 10.30am Cardiff–Portsmouth service, on 19th August 1958. Note this engine was one of the 31 examples which retained 'Joggled Frames'. ***Hugh Ballantyne/Rail Photoprints***

GWR 'Castle' class 4-6-0 No 5053 EARL CAIRNS at Plymouth North Road, seen on 4th July 1961. This locomotive was renamed from BISHOP'S CASTLE. ***Norman Preedy Collection/Rail Photoprints***

GWR 'Castle' class 4-6-0 No 5054 EARL OF DUCIE, this locomotive was renamed from LAMPHEY CASTLE. Seen at speed (recorded at 96MPH) passing Great Somerford with the Ian Allan 'Great Western High Speed Railtour', on 9th May 1964. ***Hugh Ballantyne/Rail Photoprints***

GWR 'Castle. class 4-6-0 No 5043 seen as BARBURY CASTLE the name it carried from March 1936 until renamed EARL OF MOUNT EDGCUMBE in September 1937. The engine is located on the turntable at Tyseley Locomotive Works, October 2008. ***Brian Wilson***

GWR 'Castle' class 4-6-0 No 5043 seen as EARL OF MOUNT EDGCUMBE whilst passing the signal box at Abergele & Pensarn on the North Wales Coast Route with the outward train of a Tyseley – Llandudno round trip on 6th June 2009. Even in pouring rain the superbly turned out locomotive in full cry is a great sight to behold. ***Pete Sherwood***

The Castle Concept

The Great Western Railway always saw itself as an industry leader, and as such was an unashamedly publicity seeking organisation. Historians have rightly commented that the organisation was in fact the most charismatic railway company, always striving to provide its customers with the very best in comfort and punctuality, whilst doing so with panache and style. Indeed the GWR's locomotive fleet was noted for its striking distinctive liveries, embracing a generous, but nevertheless tasteful use of copper embellishments. Much was made in GWR publicity of the 'Castles' roomy cab, with side windows and comfortable seats for the driver and fireman, also a canopy which extended rearwards for shelter. The GWR predilection for panache was reaffirmed when for the first time after World War 1, copper-capped chimney and matching polished brass safety-valve embellishments were reintroduced.

The 'Castle' and 'King' class 4-cylinder 4-6-0 locomotives designed by the company's Chief Mechanical Engineer (1922–1941) Charles Benjamin Collett were not only the epitome of grace and style but also express passenger locomotives of the very highest calibre. Right from the start the new engines attracted comment and publicity, firstly the 'Castle' class was introduced by the GWR publicity department as being 'Britain's Most Powerful Express Passenger Locomotive'. When the first of the class was exhibited in London it was met with almost universal approval and soon went on to prove itself worthy of the aforementioned title when trialled against similar sized locomotives manufactured by other railway companies.

Three preserved 'Castle' class engines seen adjacent to the turntable at a Tyseley Locomotive Works Open Day on 29th June 2008. Left to right No 5029 NUNNEY CASTLE, No 5043 EARL OF MOUNT EDGCUMBE and the then partly rebuilt No 7029 CLUN CASTLE. ***Brian Wilson***

The detractors were quick to point out that Collett's 'Castle' class locomotives were simply a development of his predecessor G.J. Churchward's 'Star' class engines. However simply making a bigger version of something is no iron clad guarantee of success and due credit must be given to Collett for making 'his' new design 'work'. It should also be noted that the success of the class was in no small way attributable to groundbreaking new production techniques which Collett introduced at Swindon Works.

The class was produced between August 1923 and July 1946 by the GWR, and then between May 1948 and August 1950 by British Railways with all of the class being rebuilt/built at Swindon Works; boilers used were 'Swindon 8' type 'Diagrams' HA, HB, HC and HD variously. The engines were modified to good effect during their working lives with the change to varying specifications of superheated boilers and double chimneys having the most beneficial effect on performance. The GWR and then BR/WR put the 'Castle' class locomotives to good use and the type became loved and respected by railwaymen and enthusiasts alike.

Collett 'Castle' class 4-cylinder 4-6-0 locomotives, 171 engines built Swindon 1923–1950

GWR 'Castle' locomotives built from other locomotive types

Old Number	Original build year and type	Last number carried	Date to traffic as 'Castle'
111	Pacific 1908	111	September 1924
40	Star 1906	4000	November 1929
4009	Star 1907	100A1	April 1925
4016	Star 1908	4016	October 1925
4032	Star 1910	4032	April 1926
4037	Star 1910	4037*	June 1926
4063	Star 1922	5083	June 1939
4064	Star 1922	5084*	April 1937
4065	Star 1922	5085	July 1939
4066	Star 1922	5086	December 1937
4067	Star 1923	5087	November 1940
4068	Star 1923	5088*	February 1939
4069	Star 1923	5089	October 1939
4070	Star 1923	5090	April 1939
4071	Star 1923	5091	December 1938
4072	Star 1923	5092	April 1938

*New front section frames fitted

'Castle' class No 5085 EVESHAM ABBEY, built from 'Star' class No 4065, is seen passing Langley Crossing (east of Chippenham) in 1957. Note this engine was one of the 11 given new front section frames. ***Rail Photoprints Collection***

In addition to new build, a batch of 5 'Star' class engines and the only GWR 'Pacific' class engine were rebuilt as 'Castle' class engines between 1924 and 1929. Other 'Star' conversions would later take place (Nos 5083–5092).

Swindon mainly built the 'Castle' class 4-6-0s in batches of 10 locomotives with the 16 rebuilt 'Star' class engines fitted in between, in no particular order but more or less as 'Stars' became due for new cylinders and boilers. The 'Star' to 'Castle' conversions required a new section to be added to the locomotives frames, behind the rear driving wheels in order to accommodate the larger 'Castle' firebox and cab, with a new boiler and cylinders also provided. Even though the old 'Star' valve gear, motion and wheels were reused, the resultant 'Castle' engines could effectively be considered as being 'new'.

There were several important differences between the 'Star' and 'Castle' designs, although the fact that the former influenced the design of the latter was never in dispute. The basic frame layout and spacing of the wheels was the same but the 4 cylinder 'Castle' design incorporated 16 inch diameter x 26 inch stroke cylinders whilst the earlier Churchward 4 cylinder 'Star' class engines had 15 inch diameter x 26 inch stroke cylinders and a GWR 'Type 1' boiler.

Both types were designed to operate with a boiler pressure of 225psi (superheated). In the early design stage Collett planned to use the Swindon 'Type 7' boiler on the 'Castle' class engines but concerns about a required 20 ton axle limit forced a rethink, accordingly the new (slightly smaller) Swindon 'Type 8' boiler was introduced. Initially the 'Number 3' Swindon superheater, used by the 'Star' class, was also selected to work with the 'Castle' boilers. The GWR pattern top feed device for introducing water to the boiler was used. In order to not loose heat the feed water was dispersed by a series of trays which caused the water to descend through the steam in a fine spray.

The 'Star' class engines tractive effort was 27,800lbf (at 85% of boiler pressure) with the 'Castle' engines being rated appreciably higher at 31,625lbf (at 85% of boiler pressure). By comparison the first Gresley Pacifics were rated at 29,838lbf (at 85% of boiler pressure).

Both designs incorporated 6 foot 8½ inch diameter driving wheels and 3 foot 2 inch diameter bogie wheels on a 'Standard' Swindon 'bar frame bogie'. The 'Castle' class grate area was 29.4 square feet in comparison to the 'Star' class grate area of 27.07 square feet. In both instances Collett chose to use Inside Walschaert valve gear with rocking shafts (piston valves).

Because of their wide route availability the 'Castles' remained the GWR/BRWR most successful express passenger locomotives during the whole of their working lives. Routes that involved the class included the West of England main line to Penzance, the South Wales route to Fishguard Harbour, the Birmingham and the North mainline to Chester, cross-country routes from Bristol via Pontypool Road and Hereford to Shrewsbury, from Birmingham via Stratford-upon-Avon, Cheltenham and over the Midland route to Bristol, and even from South Wales via Bristol and Bath to Salisbury en route (over the Southern) to Brighton and were also regular performers on the Paddington–Weymouth services. They could if required stand in for the more powerful GWR 'King' class locomotives on the hardest Paddington–Birmingham–Wolverhampton and also the Paddington–West of England turns.

The 'Castle' class GWR Power Classification was 'D' and Route Availability was Red. British Railways originally classified the engines as 6P but then reclassified them as 7P in 1951.

GWR 'Castle' class 4-6-0 No 5074 HAMPDEN (originally DENBIGH CASTLE) is seen leaving Shrewsbury with a long southbound train on the North and West route in 1956. Note the mechanical lubricator in the first position behind the modified outside steampipe. ***Rail Photoprints Collection***

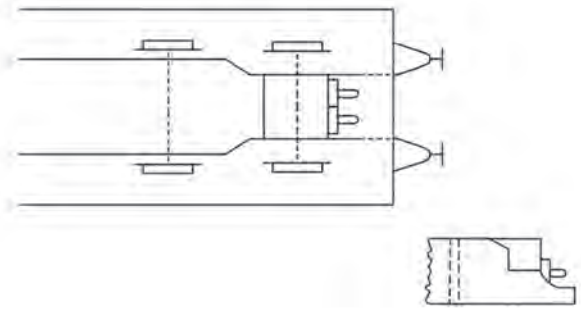


Fig 1. 'Joggled' frame set inward at the front, to clear the leading bogie wheels. Locomotives 4073–4092 and ex 'Star' rebuilds.

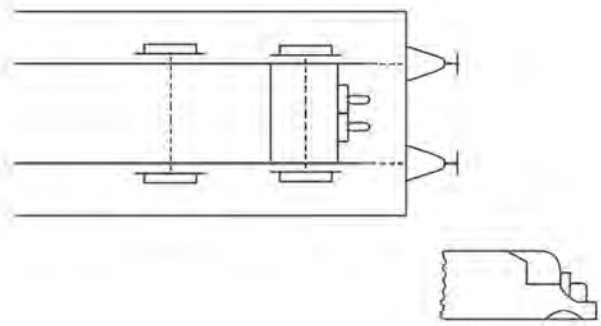


Fig 2. Straight frame with dished area, giving bogie wheel clearance. Locomotive No 4093 and all later GWR/BR 'Castles' (and rebuilds).

Fig 3. Original straight pattern outside steam pipe with mechanical lubricator in first position.

Fig 4. Modified outside steam pipe, replaced original 'straight' pattern following incidences of fractures. Mechanical lubricator in final forward position.

After the initial build of 30 'Castles', numbers 4073–4099 and 5000–5012 there followed a gap of 5 years before the next batch of locomotives were built. That batch, numbered 5013–5022, had sufficient design improvements to merit often being referred to by Swindon as the '5013' sub class. The aforementioned 1932 built locomotives had several improvements and modifications, the most obvious exterior change being the addition of a compartment to accommodate fireirons which was situated on the left hand side of the engine and located between the centre and trailing wheel splashers. That modification was first trialled on No 4085 BERKELEY CASTLE and thereafter adopted as standard, there were also changes to inside valve chest design and locomotive springing.

However, the greatest change was to the water space between the inner and outer firebox. On the original locomotives, and in order to achieve a maximum possible heating surface, the space created was narrower than that dictated by

No 4073 CAERPHILLY CASTLE seen in original condition with 'tall type' chimney, 'straight' pattern steam pipes, 'joggled' frames, curved side pattern inside cylinder casing (Nos 4073–4092, ex 'Star' rebuilds and 4093–5012 straight framed engines) and GWR pattern taper barrel buffers, circa 1930. *Rail Photoprints Collection*

No 5082 SWORDFISH seen with 'modified' outside steampipe, shorter chimney (introduced 1936) straight frames, box pattern inside cylinder casing (Nos 5013 onwards and BR straight frame rebuilds) BR pattern parallel barrel buffers and mechanical lubricator in the final forward position, circa 1961. *David Anderson*