

FROM DUNDEE TO BEAMISH IN A ROUNDABOUT WAY...

In late 2019 the restoration to working order of one of the smallest locomotives to run on narrow gauge rails commenced at Beamish Museum in County Durham. **Paul Jarman**, the museum's assistant director – transport, industry & design, tells the story to date of the ex-Dundee gas works Kerr Stuart – and also looks at other narrow gauge Scottish gas works locomotives.

In 1900, Dundee Corporation passed an act titled the Gas, Street Improvement & Tramways Act 1900. This enabled, among other things, a huge expansion of the city's gas supply network, at the heart of which was a 13 acre site to the north of the docks and east of the city centre. The construction of a gas works on this land included provision of two miles of standard gauge sidings, linking the works to the North British Railway (formerly the Dundee & Arbroath Railway) network as well as a quarter mile two-foot gauge network of sidings around the gas retorts, to enable ash and coke to be removed after the gas had been produced.

The act would also have provided the powers necessary for the corporation to take over the street tramway operation around the city from the Dundee & District Tramways Company in 1899 and commence electric tramcar operation in 1900.

The 1953 Ordnance Survey map of the area shows the standard gauge sidings entering the

site from East Dock Street to the south, branching into the East End Mineral Depot and the Gas Works site itself, where the sidings reversed a number of times to reach the travelling crane and conveyer (indicated on the very detailed OS map); presumably the means by which the coal was delivered to the retorts to enable the extraction of gas.

Drummond design

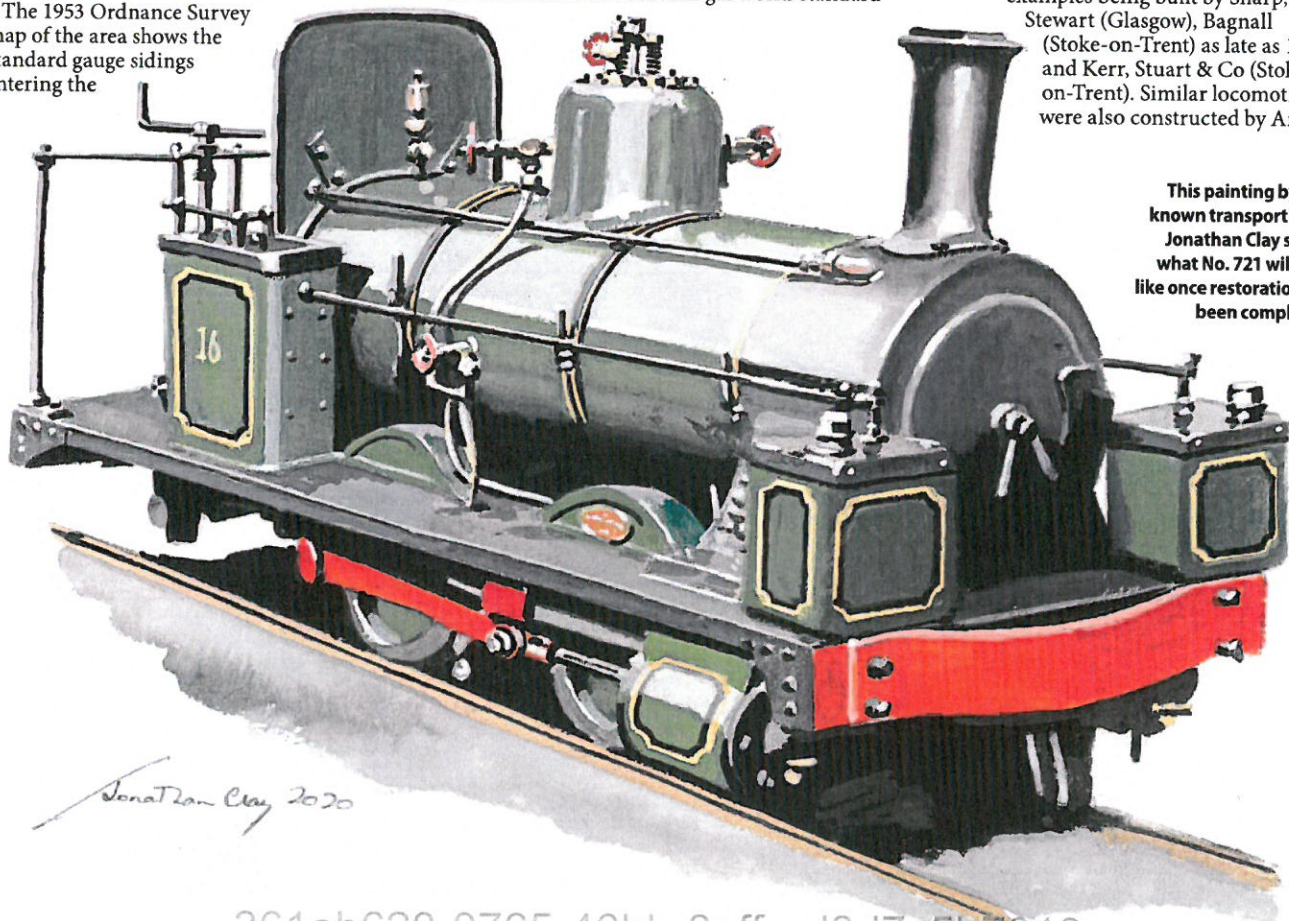
To the east of the site the map shows a narrow gauge railway system, entering the retorts at the south and bringing ash directly out onto a siding for ash to be tipped into standard gauge wagons below. This was later switched to tipping into road transport for disposal. Sidings also extend around the gasometers and up into the northern quarter of the works site.

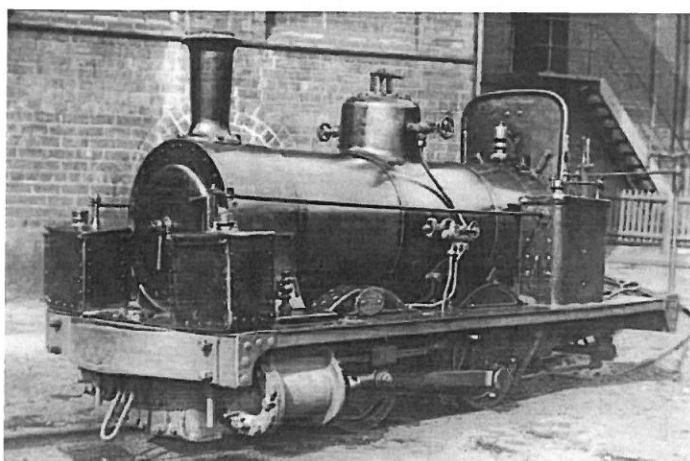
The narrow gauge locomotives supplied to the gas works were built to what could almost be described as the Scottish gas works standard

design. It was the engineer Dugald Drummond (later to make his name at the London & South Western Railway) who originated the design, created to enable access to the restricted spaces of the gas retorts being used in many larger Scottish gas works. Notably, the locomotives sat low, had short chimneys, were fitted with a well tank between the frames and had no cabs. Operating on compact systems on short journeys obviated the need to carry coal and there was no challenge presented by the limited water supply (around 22 gallons) carried in the cast iron well tank. The controls could be operated by the driver walking alongside the locomotive, and abundant sand was carried within the four sandboxes mounted on the running plates – the rear boxes not being for coal, as they might appear.

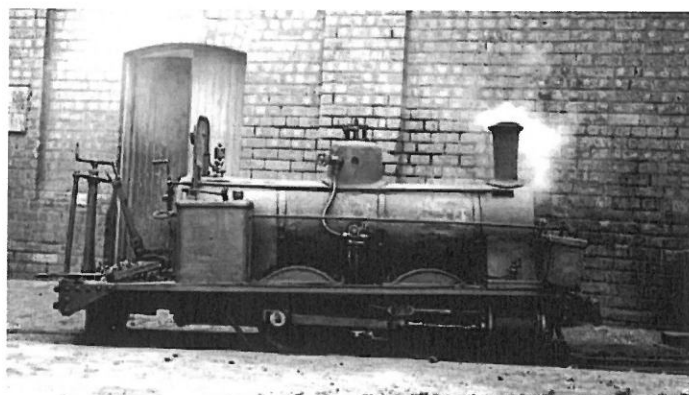
The first locomotives were built at Drummond's own works in Glasgow, later examples being built by Sharp, Stewart (Glasgow), Bagnall (Stoke-on-Trent) as late as 1942, and Kerr, Stuart & Co (Stoke-on-Trent). Similar locomotives were also constructed by Andrew

This painting by well known transport artist Jonathan Clay shows what No. 721 will look like once restoration has been completed.

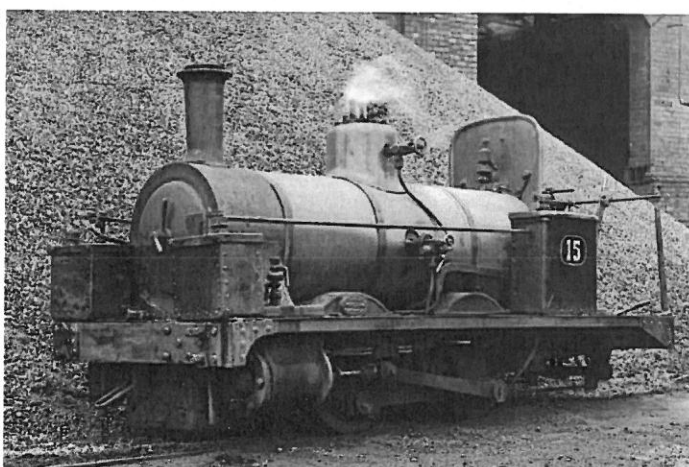




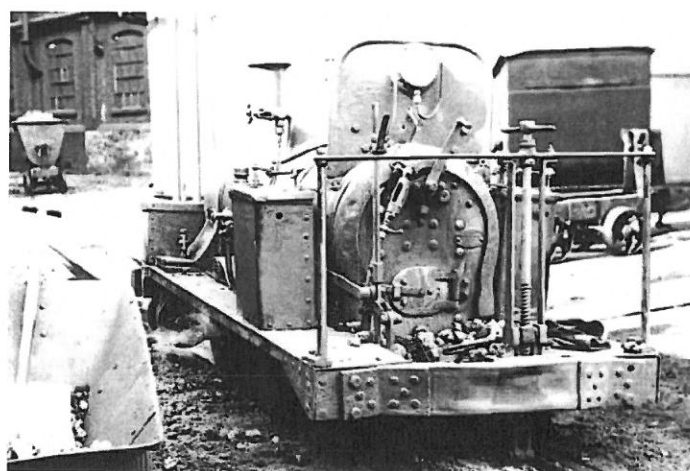
A view of No. 720 (now named *Bonnie Dundee*) taken on September 2, 1934. The locomotive, already 34 years old, is still relatively clean and smart in appearance. Note that the cylinder cladding has been removed by this point, and also the well tank visible beneath the front buffer beam. D. A. YAPP (ANDREW NEALE COLLECTION)



On May 7, 1949 No. 720 was encountered in steam and resting between duties. External condition is now somewhat scruffier than seen 15 years previously. M. J. LEE (ANDREW NEALE COLLECTION)



No. 720 was obviously well used throughout the postwar period as it is so often the subject of photographer's attentions, as seen here. Note the number, 15, carried on the sandbox and also the apparently different colour of the sandboxes compared to the boiler. FRANK JONES (ANDREW NEALE COLLECTION)



A rear three-quarter view of Kerr Stuart No. 720 on July 20, 1959, only weeks before the system closed, confirming *Bonnie Dundee* as one of the last two locos in use. Note locomotives were coaled up from a wheelbarrow and as at other gas works with similar locos, watered from a hosepipe from the nearest stand pipe as water and coal capacity was minimal – the engines only ever ran very short distances. The wagons (as depicted by the V-skip in the background) were almost certainly supplied by Kerr Stuart, who were (like many other manufacturers of narrow gauge equipment) always keen to supply a complete industrial railway package. V. J. BRADLEY (ANDREW NEALE COLLECTION)

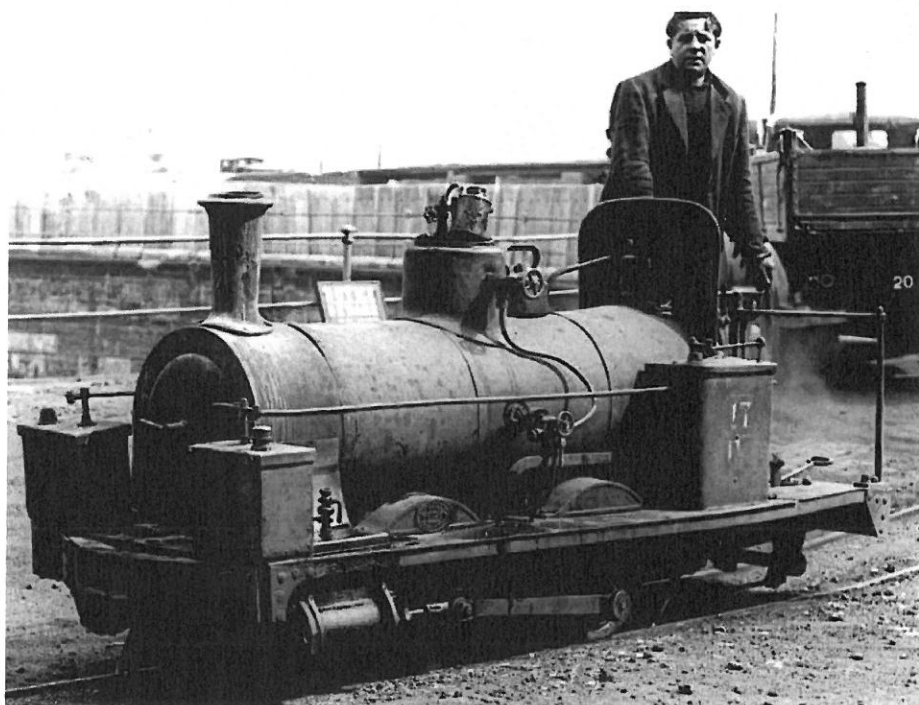
Barclay in Glasgow (a number of which survive on both 2ft and 2ft 6in gauge). The Drummond design was perpetuated in at least two sizes, with the smaller locomotives (as used in Dundee) having 7in x 5in cylinders, whilst larger examples (such as a batch of five supplied by Sharp, Stewart to Glasgow Corporation in 1893) having 6in x 9in cylinders.

Preservation pioneer

The Dundee system came to the attention of Ian Fraser, who was to become an integral part of the early UK preservation story, particularly in Scotland. He indicated to the works manager (the site then being a part of the Scottish Gas Board) that he would be prepared to slightly beat any offer from the scrapman for one of the narrow gauge locomotives. On August 13, 1959 he drove No. 720 on the railway, but returned nine days later to find the system in disuse.

His earlier offer was accepted and he selected No. 720 as being in the best condition for further operation. This was presented to him by the Scottish Gas Board and was removed from Dundee to what local newspapers referred to as his 'Palace of Steam' in Arbroath. At the formal ceremony following its arrival, No. 720 was named *Bonnie Dundee*.

No. 719 was scrapped in 1959, No. 723 having been scrapped the year before. Ian Fraser was able to obtain a small amount of spare material for his locomotive, while the rest, No. 721 apart, and including a spare boiler, was sent



On May 14, 1956 the driver of No. 723 poses on his steed within the filthy environs of the gas works yard. Note the oil jug on top of the dome, to keep the steam oil warm and easier to pour into the oil pots mounted above each cylinder – no mechanical lubrication being fitted. Another oil jug, with long stem for pouring, is sat on top of the boiler. B. METTAM (ANDREW NEALE COLLECTION)

Saving Bonnie Dundee

Reference has been made to Ian Fraser's rescue of *Bonnie Dundee* and removal to his Arbroath home. In April 1959 a planning inquiry, referred to as the 'Arbroath Affair' spent two days determining whether the application to erect an engine shed and lay a short 2ft gauge railway within the residential quiet of the Scottish town would succeed or not. It did, and No. 720, now named *Bonnie Dundee*, was moved into its new home, alongside Marshall steam tractor 'Jingling Geordie'.

Ian Fraser, a former railway workshop manager, was busy – he also had a hand in saving a number of standard gauge steam locomotives with Scottish pedigree, including D49 *Morayshire* (now at Bo'ness), Ivatt ZMT No. 46464 (now at the Strathspey Railway) and Peckett 0-4-DST 1376 (now at Brechin).

Railmotor proposal

All of the collection were subsequently found new custodians, and *Bonnie Dundee* was left with no immediate future until discussion with Ian Smith, the engineer at the Ravensglass & Eskdale Railway (R&ER) sowed the seed of an idea to rebuild the locomotive to operate on 15in gauge track. Various ideas for the form this would take were discussed, including the front runner for a time, the creation of a steam railmotor, complete with an ornate teak saloon section.

Bonnie Dundee arrived at Ravensglass in March 1976 and joined a queue of locomotives awaiting workshop attention. During this time, the visit of the elegant 1963-built 2-4-2 *Sidan* to the R&ER from the Fairbourne Railway, inspired new ideas regarding No. 720's rebuild, which would now focus on creating a compact locomotive for use on service trains.

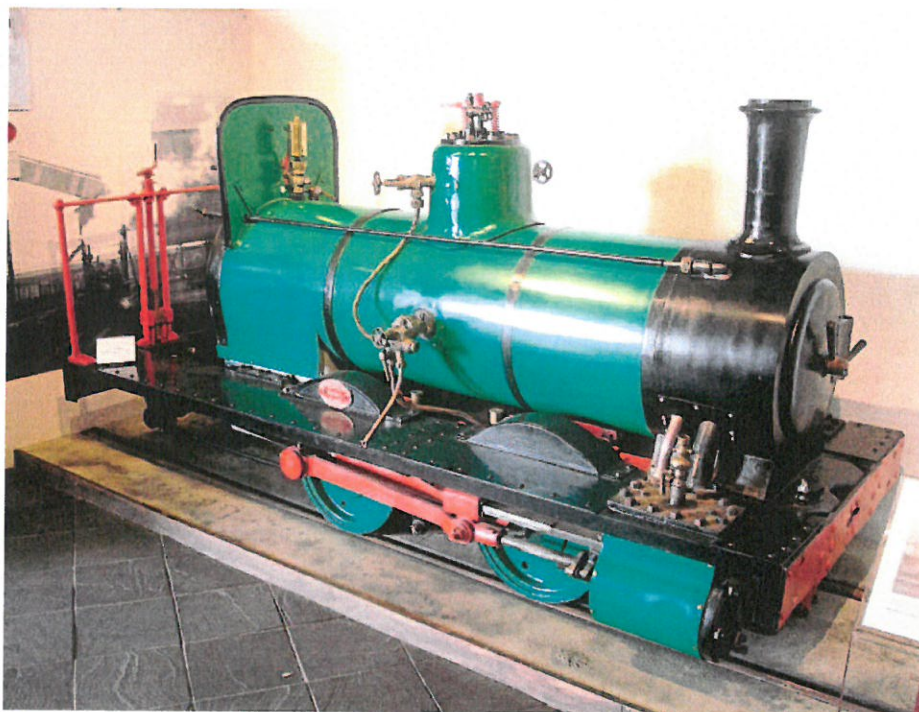
Reverse engineering

Bonnie Dundee's frames were dismantled and reversed side for side, retaining the original cast-iron well tank and cylinders. Side tanks were fitted, being those originally carried by Heywood's 0-4-0T *Ella* (which had been sold to the R&ER in 1917 and whose frames had been incorporated into a petrol locomotive in 1927), adding another 40 gallons of water capacity. A trailing truck was fitted at the rear of the locomotive, creating an 0-4-2 arrangement.

Following completion in 1982, *Bonnie Dundee* was regularly used for 12 years. As the boiler became due for renewal in the mid-1990s, a further rebuild was mooted, which would see a new boiler fitted and a number of shortcomings rectified. In 1996 the locomotive underwent another metamorphosis, with a new welded boiler fitted, the original Stephenson valve gear replaced with outside Southern valve gear and the tanks removed in favour of a new tender which gave adequate water capacity to operate within the timetable.

Beamish reunion?

After withdrawal from service, *Bonnie Dundee* was displayed from 2007 to 2010 at the Windmill Farm Railway in Lancashire, before then being placed on loan to the Cleethorpes Coast Light Railway, under whose management the locomotive has been overhauled for service in North East Lincolnshire. It is hoped that in time it might visit Beamish – to steam alongside a restored No. 721 for the first time since 1959.



Following cosmetic restoration for the reopening of the Narrow Gauge Railway Museum at Tywyn, No. 721 presented a bright and tidy appearance within the museum display in May 2011. PAUL JARMAN

to be scrapped at Entwhistle's scrapyards in Dundee. The railway's operation was replaced by diesel dump trucks.

No. 721 was delivered to the Narrow Gauge Railway Museum at Tywyn, where it was cosmetically restored and placed on display, certainly by 1972. It carried plates suggesting it contained a number of parts from No. 719, and this would indeed seem possible, given the degree of interchangeability four near-identical locomotives create – plus the need to keep the locomotives in service as long as possible.

In 2004, No. 721 was removed from Tywyn and cosmetically restored and repainted. This was to enable its installation into the new museum, which was formally opened in July 2005. In 2016 the locomotive was on the move again, this time to Beamish, where it arrived in November. The move was to create space for alternative exhibits from the Narrow Gauge Railway Museum Trust (NGRMT)

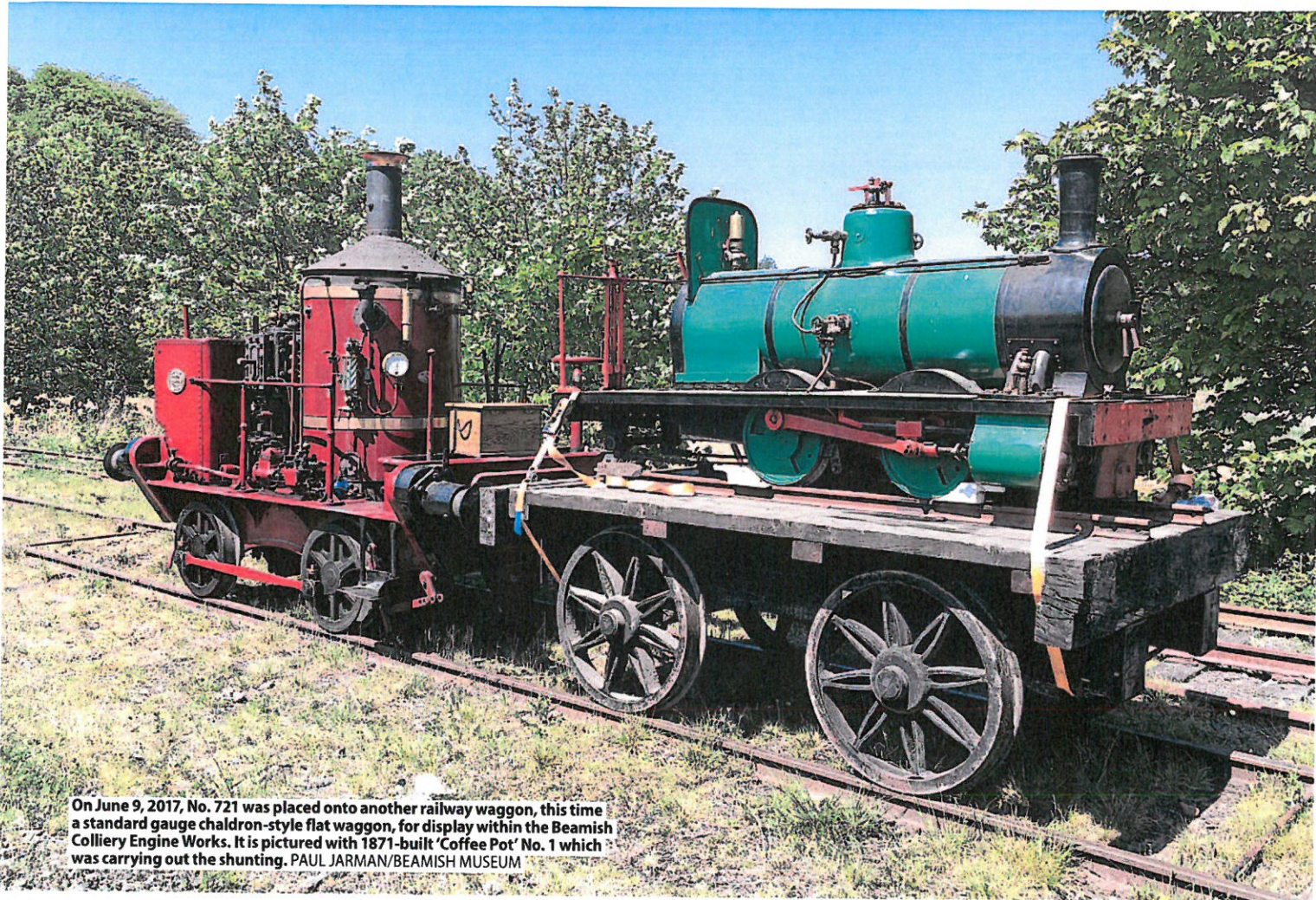
collection, including installation of 3ft 2½in gauge Fletcher Jennings 0-4-0T *William Finlay* (which itself had spent time in storage at Beamish while in private ownership).

Restoration plan

Arrival at Beamish followed a number of discussions about its future, and a move between registered museums was considered to be desirable. After arrival at Beamish No. 721 was initially stored, before making its debut appearance at the 2017 Great North Steam Fair, mounted aboard a former US Army Pershing bogie wagon from the First World War (which was on loan from the Moseley Railway Trust). In June 2017 it was placed on board another wagon, this time standard gauge, to enable the locomotive to be displayed within the Beamish Engine Works. This is a re-creation of an Edwardian colliery works and running shed, and which is home to the working



Right: In April 2017, following arrival at Beamish the previous November, No. 721 was placed aboard this USA WW1 flat wagon for both storage and display on the museum's narrow gauge railway. PAUL JARMAN/BEAMISH MUSEUM



On June 9, 2017, No. 721 was placed onto another railway wagon, this time a standard gauge chaldron-style flat wagon, for display within the Beamish Colliery Engine Works. It is pictured with 1871-built 'Coffee Pot' No. 1 which was carrying out the shunting. PAUL JARMAN/BEAMISH MUSEUM

collection of 1870s standard gauge locomotives at the museum.

With the completion of a restoration programme to return 1931 Andrew Barclay 0-4-0WT *Glyder* to steam (and retain its original appearance as far as possible, including conservation of much of the Penrhyn-applied paintwork), thoughts turned to the next locomotive which the team might tackle. The narrow gauge railway is also home to the replica 0-4-0WTG *Samson*, so the opportunity to consider No. 721 for a return to steam was considered appropriate as the narrow gauge railway at Beamish can offer a home to those engines that might not readily or easily find an operational role elsewhere.

The NGRMT was contacted with a view to carrying out reversible exploration of No. 721

in order to produce a condition report and feasibility study with regard to its potential return to steam. The museum was also expanding its staff, and apprentice Zoe Hart had been taken on in the engineering team and would be looking for a project... No. 721 would provide a suitable subject for this, given its diminutive size and the ease of handling the main components within the engineering facilities available. With agreement to proceed, a start on dismantling No. 721 was made in November 2019.

Sound state

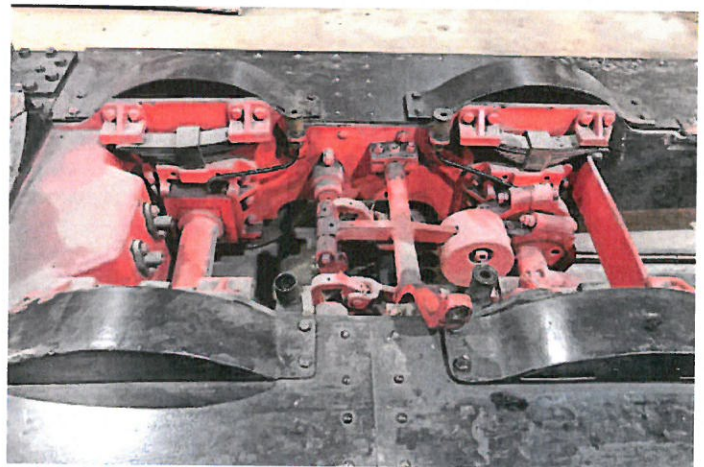
The 2004 restoration had been a cosmetic one, but had usefully been done to a standard that would enable the new components to be retained, should a full restoration

ever be undertaken. Work included new running plates and boiler cladding as well as a repaint (into a light green colour). The sandboxes were removed but stored and will be reunited with No. 721 – and new cladding made to fit the cylinders. This new material made the dismantling process relatively straightforward and the locomotive's boiler was quickly removed to enable inspection, as well as enabling the very compact mechanical elements of the locomotive to be accessed.

The feasibility report to the NGRMT covered a number of areas, but overall considered No. 721 to be in sound condition and suitable for a return to steam with minimal intervention to original material. The well tank, a casting, had been punctured at some point and would require removal for specialist



Following dismantling at the rear of the museum's tram depot, No. 721's boiler was mounted onto a trolley in readiness for its tubes to be removed. PAUL JARMAN/BEAMISH MUSEUM



A close-up of what is located between the frames – barely visible when the locomotive is assembled and revealing just how compact the valve gear on this design of locomotive is. PAUL JARMAN/BEAMISH MUSEUM

More on the Barclays

Reference has been made in the main text to a design of gasworks locomotive produced by Andrew Barclay in Glasgow. Two pockets of these locomotives could be found – on the 2ft gauge system at Granton in Edinburgh and at a number of sites in Glasgow, the latter being 2ft 6in gauge. Two locomotives from each city have been preserved and their history is outlined here.

In 1903 the Edinburgh and Leith Gas Commissioners took delivery of their first narrow gauge locomotive, Andrew Barclay No. 988, at Granton and named this engine *Esmé*, later to be given the number 5. In 1920 the gas works was taken over by the Edinburgh Corporation Gas Department, a move which perhaps precipitated the numbering of the steam locomotives there and the loss of names.

No. 5, the former *Esmé*, was sold to J H Farr (the President of the Scottish Traction Engine Society) in 1961 and was later purchased by the National Museum of Scotland following its display at Biggar Gas Works Museum for a number of years.

Another Granton locomotive was No. 9, which was sold to Dr R P Jack in 1966 and later to Nick Williams who restored the locomotive, gave it the name *Jack*, and has toured the UK (and some of the European) narrow gauge railways with the locomotive for many years.

The other system of note in this story was that built by Glasgow Corporation at Provan in 1904. Equipped with nine Barclay 0-4-0Ts and a fleet of bogie wagons



***Esmé* and *Jack*, referred to in the text, at Beamish's April 2013 Great North Steam Fair. *Jack* has enlarged side tanks and bunkers fitted, to make it more suitable for railway running rather than operation within the confines of a gas works. PAUL JARMAN/BEAMISH MUSEUM**

for removing substantial quantities of ash from the retorts, the system was closed in 1959. No. 3 in the fleet (No. 984 of 1903) was sold for scrap in 1961, being resold to preservationist Rich Morris and later displayed at the narrow gauge railway museum at Gloddfa Ganol. Subsequently sold again, FMB Engineering commenced reconstruction of the locomotive, including regauging it to 2ft.

The incomplete project was sold on to a group in Kent who completed the work and adapted No. 3 to give it a new appearance as a saddle tank, complete with the name *Darent*. In 2011, this nomadic locomotive was purchased by two individuals for use on the Hampton & Kempton Waterworks Railway, arriving there in 2013 and where the locomotive remains today.

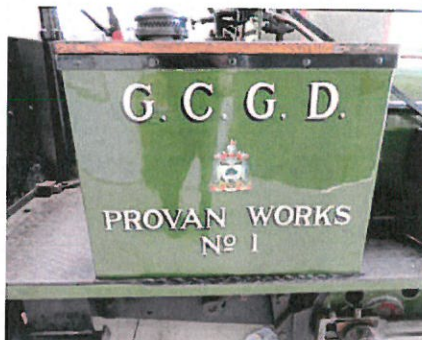
A tenth locomotive (No. 2207 of 1946), No. 1, replaced an earlier locomotive bearing that number at Provan in 1946. Withdrawn in 1958, No. 1 was preserved by the Railway Enthusiast's Club at Farnborough, Hampshire. It was later sold, in dismantled condition, for use on the Welshpool & Llanfair Light Railway (WLLR), arriving there, via Oldbury, in 1969. Narrow gauge locomotives were far more portable than standard gauge examples, as can be seen by the frequent sale and movement of the examples described here!

The water capacity of No. 1 (now numbered 8 in the WLLR fleet and named *Dougal*) was doubled and the handbrake restored. It made its debut in steam in December 1975. Following overhaul in 1997, *Dougal* was outshopped in the livery of Glasgow Corporation Gasworks Department, complete with a more traditional water tank shape.

The locomotive is currently displayed, out of service, though it made a brief return to steam in 2018, during a period of loan to the Taiwan Sugar Corporation, returning to the WLLR in April 2019.



In January 2013, 1903-built Granton Gas Works No. 5, also known as *Esmé*, arrived at Beamish on loan from the National Museum of Scotland, following a lengthy period of storage at its Granton facility. The locomotive was to be assessed for a potential return to operating condition as part of the loan. This later revealed that such work was not feasible within the museum's capacity or budget and the locomotive was later returned to Scotland intact. PAUL JARMAN/BEAMISH MUSEUM

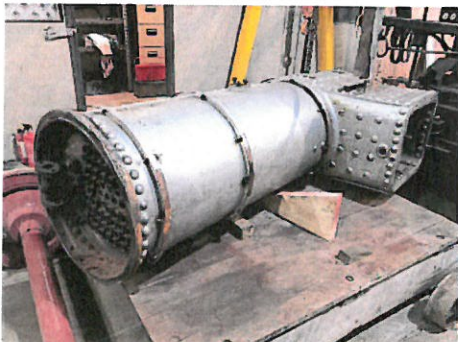


A close-up of *Dougal's* bunker, bearing the initials of the Glasgow Corporation Gas Department, the location of Provan Works and the locomotive's number as well as the Corporation's coat of arms. PAUL JARMAN

***Dougal* is currently out of use at the Welshpool & Llanfair Railway, but it is usually on display within the exhibition building at Welshpool Raven Square where it is pictured in the company of Bagnall 0-4-4-0T *Monarch* – representing two extremes of motive power size on the railway. PAUL JARMAN**



The rolling chassis of No. 721 will be moved into the museum's machine shop once the boiler has been prepared for repair. The well tank (beneath the smokebox saddle) will be removed for repair, which may entail removal of the cylinders too. PAUL JARMAN/BEAMISH MUSEUM



The boiler laid on its side to aid access via the firebox to the tube ends. PAUL JARMAN/BEAMISH MUSEUM

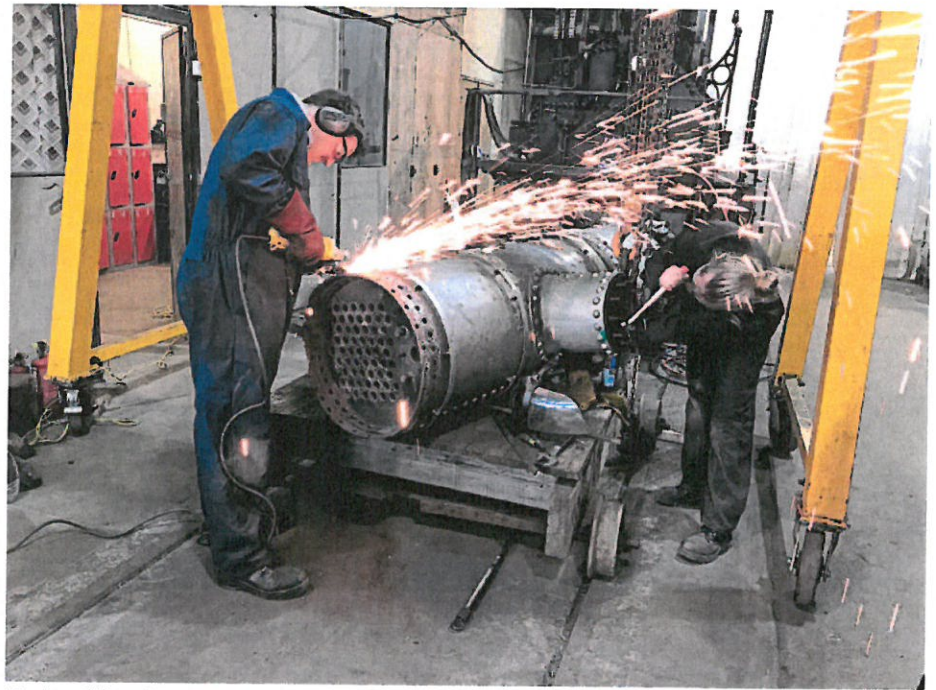


The original brass tubes fitted to No. 721's 1944 Hunslet-built boiler. They remain in excellent condition, though will be replaced with steel tubes when the boiler is reassembled. PAUL JARMAN/BEAMISH MUSEUM

repair, while the rest of the locomotive was found to be mechanically tired, but complete. The coupled wheel tyres would need to be replaced and further inspection of the axleboxes, journals and cylinder bores was recorded as requiring further investigation.

Zoe will complete the mechanical overhaul under the supervision of her engineering mentor at Beamish, Don Cook. The pair have recently worked on the stunning rebuild of an 1895 Savage Centre Engine for the museum's steam gallopers, so are already developing an impressive track record of heritage engineering work.

The boiler was built in 1944, a replacement supplied by Hunslet and one of a number that



Matthew Ellis and Zoe Hart remove the front tubeplate rivets. PAUL JARMAN/BEAMISH MUSEUM



Apprentice Zoe Hart uses an air hammer as part of the process of removing the rivets securing the front tubeplate. The project will be her final apprenticeship piece as part of a full engineering apprenticeship supported by the museum and aimed at creating a succession plan for retention of heritage-appropriate skills within the organisation. PAUL JARMAN/BEAMISH MUSEUM

it appeared were supplied to the gas works for their fleet. No. 720 also received a new boiler at that time, and Ian Fraser reported a spare boiler as going for scrap in 1959. The boiler condition was examined and corrosion identified on the front tubeplate (necessitating replacement) and the front section of the lower barrel.

Full overhaul

Confident that further work could be undertaken by the team at Beamish, a further approach to the owners was made regarding the process of returning No. 721 to operating condition. This was approved and work began in earnest in March 2020. Led by keeper of

transport Matthew Ellis, assisted by Zoe, the boiler's brass tubes were removed, along with the internal steam pipe and regulator.

In late March 2020 the museum was closed due to the Covid-19 outbreak, and so work on No. 721 was suspended. Limited work was resumed in March 2021 with final dismantling of the boiler being carried out. The boiler was then prepared for inspection by the museum's appointed insurance company for steam boilers, British Engineering Services.

At this stage the mechanical components have been left untouched and kept in store until the extent of the boiler repairs required are fully understood, but it is hoped to move them into the machine shop later in 2021, this work being an integral component of Zoe's apprenticeship.

No. 721 will be restored to as close to its 1901 condition as we can determine, allowing for the 1944 boiler now fitted. Livery was dark green with black borders and yellow lining. Railway artist Jonathan Clay was commissioned to produce a painting of No. 721 in this condition to inspire the project and show what the team at Beamish is hoping to achieve. [HR](#)

Dundee Gas Works locomotives (2ft gauge)

Builder	Works No.	Year	Dundee No.	Withdrawn
Kerr, Stuart & Company	719	1900	14 (originally 1)	1959 (Scrapped)
Kerr, Stuart & Company	720	1900	15 (originally 2)	1959 (CCLR)
Kerr, Stuart & Company	721	1901	16 (originally 3)	1959 (Beamish)
Kerr, Stuart & Company	723	1901	17 (originally 4)	1958 (Scrapped)