

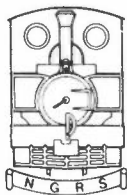


THE NARROW GAUGE

No. 84



NARROW GAUGE RAILWAY SOCIETY



NARROW GAUGE RAILWAY SOCIETY

Serving the narrow gauge world since 1951

SECRETARY :
MEMBERSHIP SECRETARY : P.A. Slater, The Hole in The Wall, Bradley, Ashbourne, Derbys.
TREASURER : J.H. Steele, 32 Thistley Hough, Penkull, Stoke-on-Trent, ST4 5HU.

The Society was founded in 1951 to encourage interest in all forms of narrow gauge rail transport. Members interests cover every aspect of the construction, operation, history and modelling of narrow gauge railways throughout the world. Society members receive this magazine and *Narrow Gauge News*, a bi-monthly review of current events on the narrow gauge scene. An extensive library, locomotive records, and modelling information service are available to members. Meetings and visits are arranged by local areas based in Leeds, Leicester, London, Malvern, Stoke-on-Trent and Warrington. Annual subscription £4.50 due 1st April.

THE NARROW GAUGE

ISSN 0142-5587

EDITOR : M. Swift, 47 Birchington Avenue, Birchencliffe, Huddersfield, HD3 3RD.
ASSISTANT EDITORS : R.N. Redman, A. Neale.
BACK NUMBER SALES :

Published quarterly by the Narrow Gauge Railway Society to record the history and development of narrow gauge rail transport. Our intention is to present a balanced, well illustrated publication, and the Editor welcomes original articles, photographs and drawings for consideration. Articles should preferably be written or typed with double spacing on one side of the paper only. The Editor appreciates a stamped addressed envelope if a reply is required. A range of back numbers, and binders for eight issues are available from the address above.

Copyright of all material in this magazine remains vested in the authors and publisher. Reproduction of whole or part of this magazine by any process is forbidden without the written permission of the Editor.

Printed by Hadfield Print Services., Mount Pleasant Street, Ashton-under-Lyne. Lancs.

EDITORIAL

No 84 SUMMER 1979

Most members have a favourite narrow gauge locomotive, and these will probably be small, well proportioned and full of character. Few designs meet these requirements so completely as the Bagnall 2-4-0T described in this issue by Allan C Baker. Their button-sized wheels, long connecting rods, tiny boilers and cylinders, and tall, spindly chimneys combined to portray a style which endears Victorian machinery to so many people. Could the Rye & Camber Tramway, for example, have inspired Roland Emmett's Far Twitting & Oysterperch Railway, so well known to older readers of *Punch*? Certainly some of his creations bore more than a superficial resemblance to CAMBER or VICTORIA. Perhaps this article will inspire our globe-trotting members to seek out other survivors of the type, and the excellent drawings by Ted Wade and David H Smith spur our modelling members to recreate their charm.

"Lough Swilly Memories" by Peter Halton in our last issue proved very popular, and Bob Wilkinson now describes a few days in Austria on a railway which can still be enjoyed. If we are to continue this series of articles we need many more contributions.

1979 is a year of anniversaries. A century of electric traction on the narrow gauge is commemorated in this issue, but we had also planned to record 24 years of service on the resuscitated Festiniog Railway. However, the length of the two major articles caused this, and several shorter features, to be held over until the Autumn issue.

Cover: The Eastern Railway of India branch from Shantipur Jc. to Nabadwip Ghat is one of the lesser-known 2ft 6in gauge lines in the vicinity of Calcutta. its roadside route and tiny tank locomotives combine to create this charming rural scene recorded by L A Nixon in February, 1974. Allan C Baker describes the origin and development of the Bagnall 2-4-0 tank elsewhere in this issue.

A DREAM IN REALITY

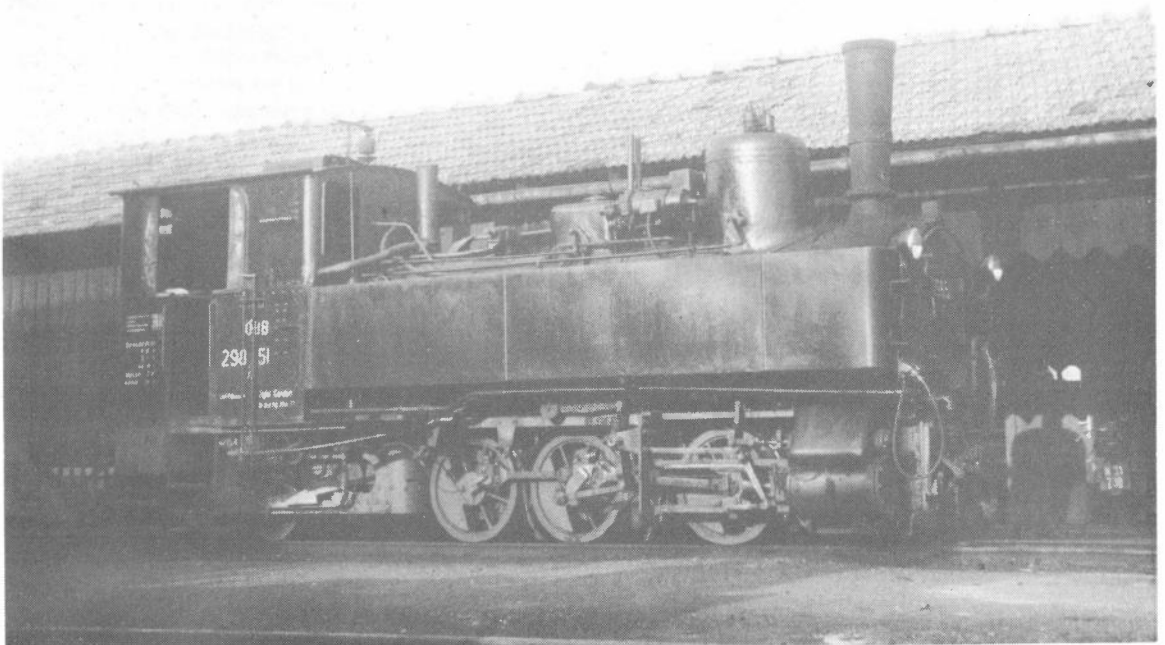
R.C.Wilkinson

In 1972 I read an article in *The Narrow Gauge* No 60, where Peter Lemmey, in "Steam Along the Steyrtal", described an entirely steam operated narrow gauge railway in Austria. It had six locomotives, a reasonable passenger service, a busy freight service, and no-one else seemed to have heard of it! I resolved to go and see this survivor for myself, so, that August, I journeyed across Europe and eventually stepped from the main line train onto the platform at Garsten.

It was astonishing: All my dreams about long-vanished British narrow gauge lines had come true. There was a rake of four wheel carriages behind an old 0-6-2 tank, whilst around the corner a freight yard and locomotive shed were visible. I followed the tracks to the shed, and what a nice surprise. This was no run down set-up, each of the standard 298 class locomotives was well kept, though not shiny, for these were working engines. Details of the home depot, bunker and tank capacities were simply painted on each cab side sheet. These machines were obviously not new, their slanting slide valve chests and large steam domes gave them a quaint, Victorian appearance, but welded side tanks and electric lighting showed that thoughtful modernisation had extended their useful lives.

Returning to the station, I enquired for the youth hostel, but discovered that it was full up, which, not surprisingly, rather upset my plans. One of the station staff invited me into the general office, made a telephone call, and gave me to understand that I was to be placed in the care of the guard on the next train, and he would see that I alighted at a certain station, where a hotel room awaited me. I thanked him in German—the only word I knew at the time—and joined the train.

As we left the station, I couldn't believe my luck. Here I was, riding a real, steam hauled narrow gauge train, going I knew not where, simply trusting. The other passengers were not tourists out for the day, or even railway enthusiasts, just local people going about their business. The bark of the little engine's exhaust rapidly drove any



A portrait of 298.51, built by Krauss & Co, Linz in 1898, in the evening sunshine at Garsten on 15th August 1972.
(R.C. Wilkinson)

apprehension from my mind. It wasn't a heavy train, yet the engine was really working hard. And what a line! A steeply graded hairpin bend first carried the railway away from the standard gauge station; then a long climb finishing in a sharp bend took it up to the floor of the Steyr valley proper. Station followed station, names I couldn't pronounce. More people left the train at each stop, and fewer got on. Dusk fell and I began to wonder if the guard had forgotten about me. Finally, after the train had been travelling for an hour or so, he came along as we approached a station and let me off at Grünburg into the charge of the station-master.

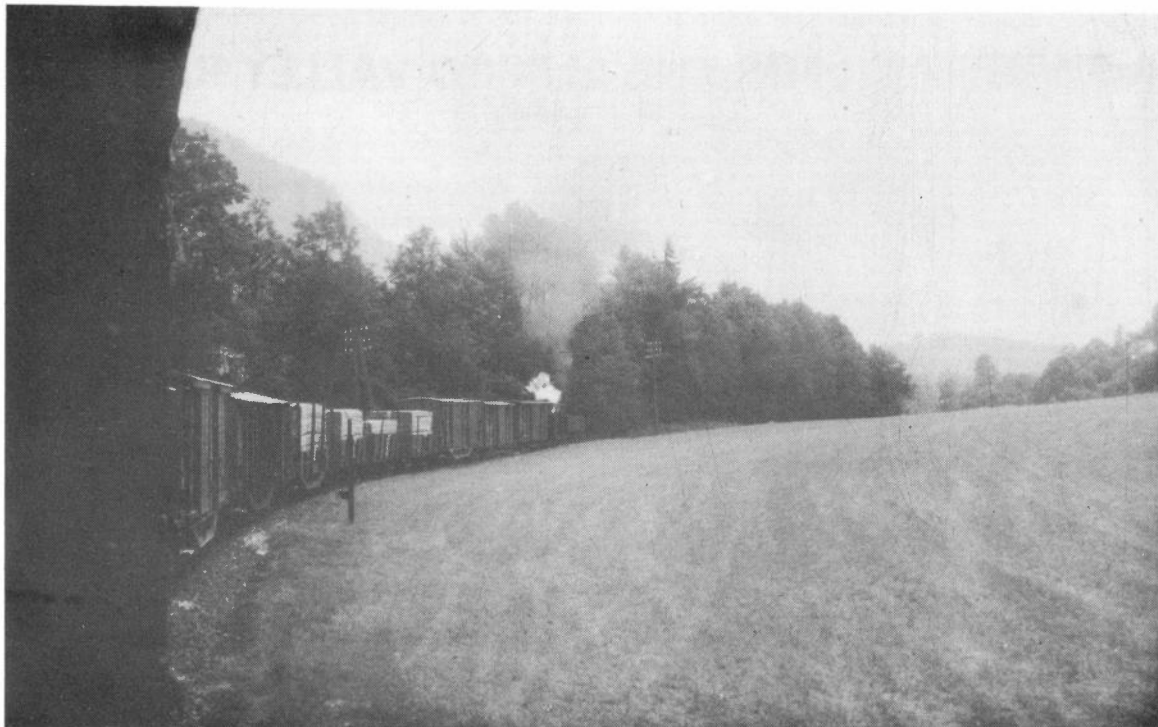
We had to wait some time for the last trains in either direction before he could leave the station. Dusk turned into night, and in the distance I heard whistles, and the sounds of steam. Suddenly I was a very thrilled little boy again, remembering locomotives and times long past in England. Here I was in a foreign country listening once more to the sounds I love, quite relaxed at heart and knowing that I was safe for the night. Two headlight appeared, and showed the way for another of the 0-6-2 tanks to enter the loop. She paused, the vacuum pipes looking out of place on a continental engine. The hum of the twin turbo-generators, supplying power for the engine and train lighting, reminded me of a Bulleid "Pacific" at rest. The last train down the valley appeared a little late, ran in quietly and, almost immediately, was off again into the night. The other train restarted, rolled down a short gradient under a bridge, and it too was gone.

The vitality of the station faded as rapidly as it had grown. It was a quiet, warm Austrian evening and I still didn't even know where I was to stay. The station-master finished locking up, gave me a lift into town, and dropped me outside a Gasthaus where a meal was already prepared. I thanked everyone as much I could. The trouble they had taken over one English railway maniac immediately put Austria tops in my book, and this hospitality was to be repeated many times on future visits.

I slept well that night, and wandered down to the station quite late the following morning. The first thing to catch my eye was a curious shed containing an unusual vehicle and, although I examined it through the



*ÖBB 699.103 takes a break at Grünburg whilst hauling the morning freight train from Garsten to Klaus on 16th August 1972.
(R.C. Wilkinson)*



The amount of freight, and the character of the line is evident in this view from the rear of the train.
(R.C. Wilkinson)

windows, I couldn't imagine what it was. Later, after an interesting interview, I learnt that it was a snow plough. The flower baskets hanging from the roof of the main building provided an atmosphere which reminded me more of a pub garden than a railway station, until I noticed the immaculate track and modern rolling stock. There were two huge bogie vans on one siding. Each was 17.6m long, had a capacity of 10,000 kg, and, although built as long ago as 1942, was mounted on Freidmann roller bearing axleboxes and fitted with vacuum brakes. Vehicles in this style are rare enough on B.R., but to find them on a little line in Austria seemed amazing. I was later to discover that they were a standard type, in sharp contrast to my own ideas of Welsh narrow gauge—four wheel slate wagons!

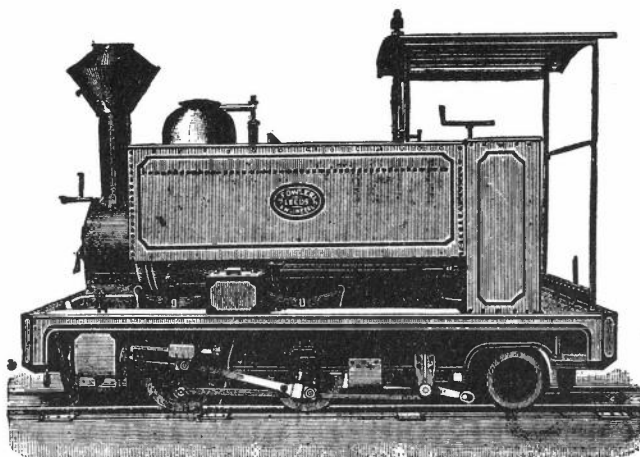
Whilst I had been studying the station, time had passed unnoticed, but the sound of an approaching locomotive sent me hurrying for my camera. I took a photograph, then stopped and stared. This was something completely new to me—a 699 class 0-8-0 tank—the result of many years of progress in narrow gauge design and construction, and a valid successor to the sweet little 298 class. What a locomotive! All welded side tanks and cab, piston valves, Giesl ejector and spark arrester, a tough, uncompromising machine well suited to hauling its long train of timber and general merchandise.

What happened next? Well, I had a super day and arrived back in Grünburg tired and hungry. All the traffic was on the railway because in 1972 there was no super highway through the valley. However, during the day this proposal for a new road was explained to me, along with useful German words such as gauge glass, snow plough, vacuum brake, and many others. Mind you, I still couldn't order a meal or book a room in German!

Two years later I returned to the Steyr valley once more, and found the railway much the same as before. The new road had been built by then, there were more houses and people in the valley, but apparently fewer on the train, and certainly less freight on the railway. So there it survives; a useful, well-cared-for asset, and, more important, a real railway still serving the local community. At the moment it is still worked entirely by steam, but this may not last much longer. ÖBB are reputed to be interested in modern diesels made redundant by line closures in Yugoslavia, and if these are purchased narrow gauge steam working in Austria could disappear almost overnight. The Steyrtalbahn runs for 41km (25½ miles) from Garsten to Klaus, and the service is shown in table 28b of the Austrian railway timetable. Go and see it now! Lucky you.

A SWEETENER FOR THE ALFORD VALLEY RAILWAY

A.H. Sangster



When the Alford Valley Railway Co Ltd was formed, to construct a 2ft gauge line connecting the proposed Grampian Region Museum of Transport with the well established Murray Park at Bridge of Alford, a major task was to locate suitable track and rolling stock. We were able to obtain a Lister diesel locomotive, track and wagons from New Pitsligo, which allowed the company to lay $\frac{1}{2}$ mile of temporary track at Bridge of Alford, but to work the anticipated summer traffic a steam locomotive was required, in addition to being an attraction in its own right.

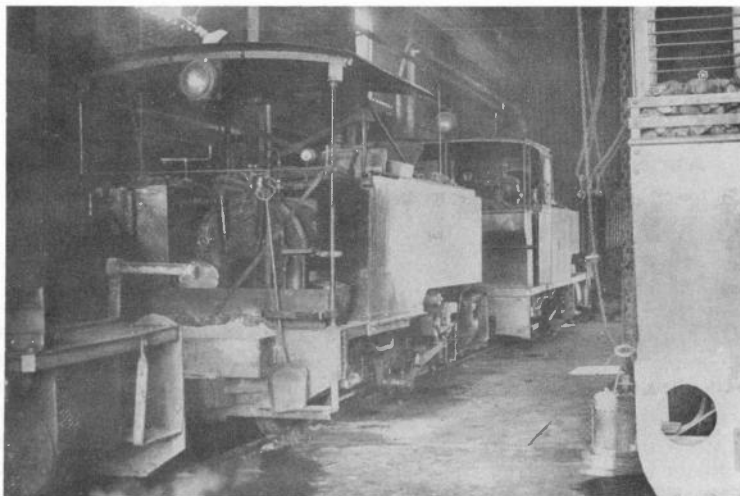
In a leaflet describing the Alford Valley Railway Association, the group supporting the Company, the above engraving of a Fowler 0-4-2 side tank was used, captioned "The type of steam locomotive to be used on the railway". It was intended as a typical illustration of a narrow gauge machine, but proved to be a most appropriate choice! I wrote to the railway press to publicise our plans, and in due course received a letter from Mr David Cairns, Director of the South African Sugar Cane Association, and a native of Aberdeen. He had read about our plans in *Railway Modeller*, sent colour slides showing a number of locomotives, and asked if we would like one. The seven directors of the A V R Co met, viewed the slides, and agreed to follow up this offer. Mr Cairns arranged to have the locomotives inspected with a view to selecting the best one, and reported that SACCHARINE was mechanically sound, had a good boiler, and was essentially complete except for a few fittings. Even taking into account the cost of shipping, this generous offer meant that we could obtain a locomotive at much less cost than we had expected.

We contacted Davidson, Park & Speed, Shipping Agents of Glasgow, who had connections in South Africa. Mr Cairns arranged to transport the locomotive to Durban, and the agents representatives negotiated a very economical rate on a Spanish vessel bound for Goole. The only disadvantage of this method was that it took rather longer than anticipated, in fact arrival was some three weeks later than expected, but the substantial saving in cost was worthwhile. Mr Bill Barrack, one of our Directors, had a low-loading trailer and we were therefore able to collect the locomotive from Goole and transport it directly to Alford where we had made arrangements with the Grampian Regional Council to have it stored beside the former carriage shed at Alford station.

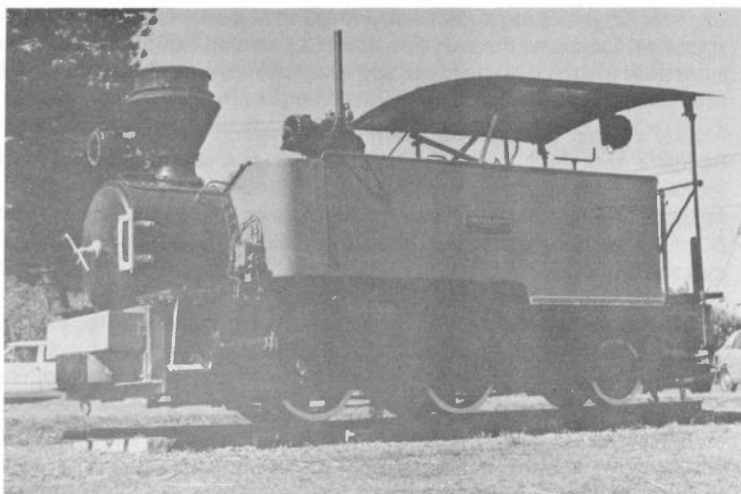
No major work has been done to SACCHARINE so far, but we received a very generous offer from Babcock & Wilcox Ltd to retube and refurbish the boiler and fittings as part of their apprentice training programme. The side tanks will be removed, and by the time you read this the boiler and frame should be under restoration in Renfrew. We expect that the locomotive will be ready for traffic next year.

William Tawse Ltd, a well-known member of an Aberdeen construction group, have provided plant and equipment to prepare the trackbed for the new line, and a qualified civil engineer to ensure that the work is completed to the highest professional standards. We are also trying to secure sponsorship from Grampian Television and industrial concerns in the Aberdeen area for the purchase of carriages, and while progress is never so fast as we would like, we do feel that we have gone a long way towards building a narrow gauge railway from scratch.

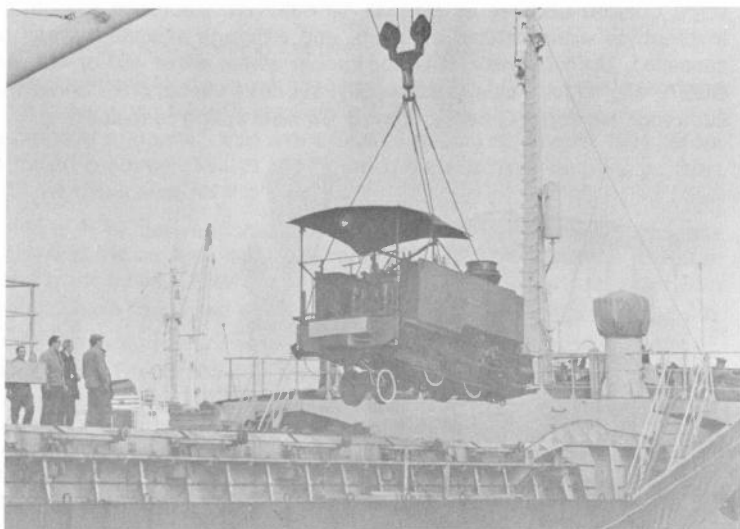
The locomotive shed at Natal Estates with SACCHARINE and the Hunslet 0-4-2T HILLHEAD resting between duties. (F. Jux)



SACCHARINE on display at Natal Sugar Estates, Edgcombe estate November 1971. (D. T. Rowe)

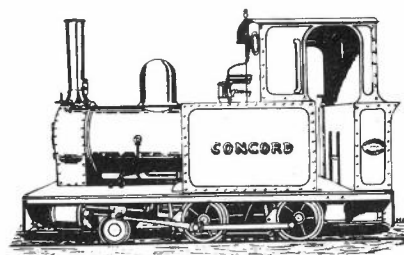


SACCHARINE being swung ashore from the ALGALO at Goole on April 19th. (Ron Cox)



JESSIES, CONCORDS & POLAR BEAR

A brief history of the Bagnall 2-4-0 side tank locomotives



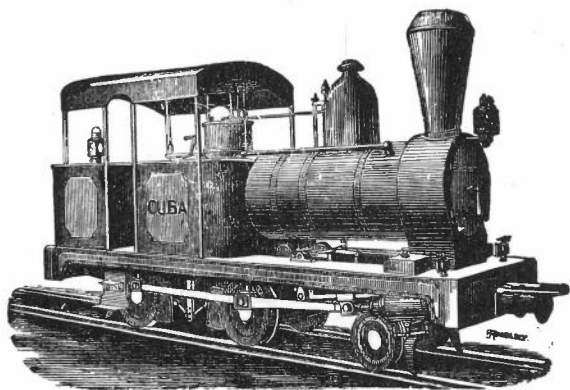
Allan C. Baker

One of the earliest claims of William Gordon Bagnall, after he set himself up as a railway engineer, was the complete equipping of light railways. Bagnall's were never just locomotive engineers, but also specialised in the supply of trackwork and rolling stock. W G Bagnall entered into a partnership with one John Hill in 1876. Hill had previously been in partnership with Bernard Massey, acting as millwrights, and trading as Massey & Hill at Castle Town, Stafford. On 26th February 1876, Bagnall acquired Hill's holding in the partnership, and thereafter he traded as W G Bagnall. The Massey & Hill partnership had terminated on 30th March 1875 and it would be about that time that Bagnall appeared on the scene.

Under Bagnall's capable management the small millwrights business grew rapidly, and the number of men employed increased from half a dozen to several hundred before his death in 1907. He seems to have first advertised his ability to build railway locomotives in the *Stafford Advertiser*, on 15th April 1876, although the first example did not appear from the Castle Engine Works until December.

Early Bagnall locomotives were an interesting and diverse collection, and only rarely were two identical. Bagnall's desire to completely equip small narrow gauge and portable railways soon led to the development from the basic four-coupled type to one with a leading pair of carrying wheels, thus enabling increased power to be combined with a lower axle load, ideal for use on light, often temporary, track. This type of railway, of which Bagnall made great play in his publicity, could be used with advantage on plantations, military fronts, large farms and the like. Thus the classic 2-4-0 side tank came into being, and was to remain in production at Stafford from 1882 until 1935 in various forms. It became a typical, and unmistakable Bagnall product which somehow managed to survive the complete redesign of most Castle Engine Works locomotives when Ernest Edwin Baguley joined Bagnall in 1891. Several of this inventive man's ideas were subsequently embodied in those locomotives built after he arrived, but the basic concept remained, and a popular machine it was for its intended sphere.

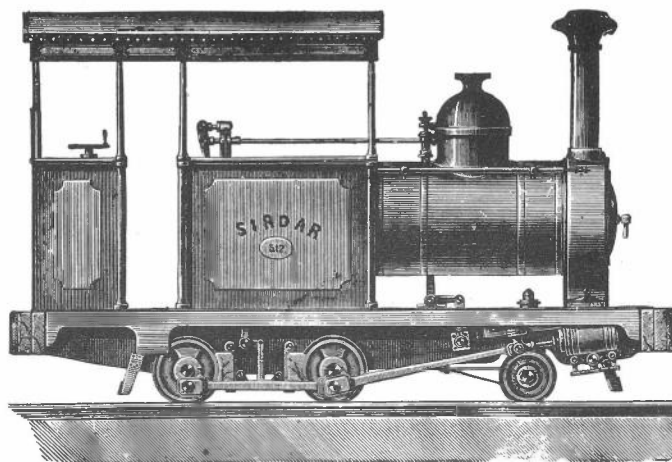
The first two locomotives of this type were built in 1882, and were the first Bagnall locomotives with any carrying wheels. Inside Stephenson's link motion and an extremely small rear water tank were incorporated, and with a copper firebox and brass tubes works numbers 450-1 cost £537 each. Both engines were purchased by G Bailey Toms & Co, who were quoted in literature at this time as Bagnall's London agent. Indeed, they gave the same London address as Bagnall himself: 7A, Laurence Pountney E.C. Two similar, but slightly smaller locomotives were ordered by them, and although allocated works numbers 460 and 484 were subsequently cancelled. Unfortunately, it is not known where either 450 or 451 were destined, but the name of the latter, CUBA, might give a clue. Additionally, in one of the old order books the extra name B H Loins & Co is given as a customer. No doubt G Bailey Toms & Co were acting as their agent.



CUBA, the second 2-4-0T, set a style which was to endure for over fifty years.

(collection A.C. Baker/T.D.A.Civil)

This contemporary engraving of SIRDAR shows the number 512 on the cab-side plate, which does not agree with Bagnall order books. The tiny cylinders and wheels were a characteristic of the 2-4-0 tanks. (collection A.C.Baker/T.D.A. Civil)



In January 1883, the agent Walsh Lovett & Co ordered a similar engine which is thought to have been for use in India. Works number 511, a slightly smaller version of 450-1, is quoted in all the old order books as carrying the name SIRDAR, and cost £408/5/- (£408.25). In this case Bagnall took the opportunity of building a second locomotive for stock, works number 512, and this machine was eventually sold in February 1886 to Stothert & Pitt of Bath, but before this is thought to have been sent to India for exhibition in Calcutta. This cost £364/7/9d (£364.37), and is recorded as being named SOUDAN. Both locomotives had copper fireboxes and brass tubes.

The issue of *Engineering* for 18th April 1884 gave details of a locomotive and car being exhibited at the Calcutta show during that year. Apparently, a portable 2ft gauge railway, consisting of 16 lb per yard rail and steel sleepers, was laid around part of the grounds. A locomotive of this type showed its paces, together with eight wagons suitable for carrying sugar cane and other colonial produce, and three passenger cars, each capable of seating eight passengers.

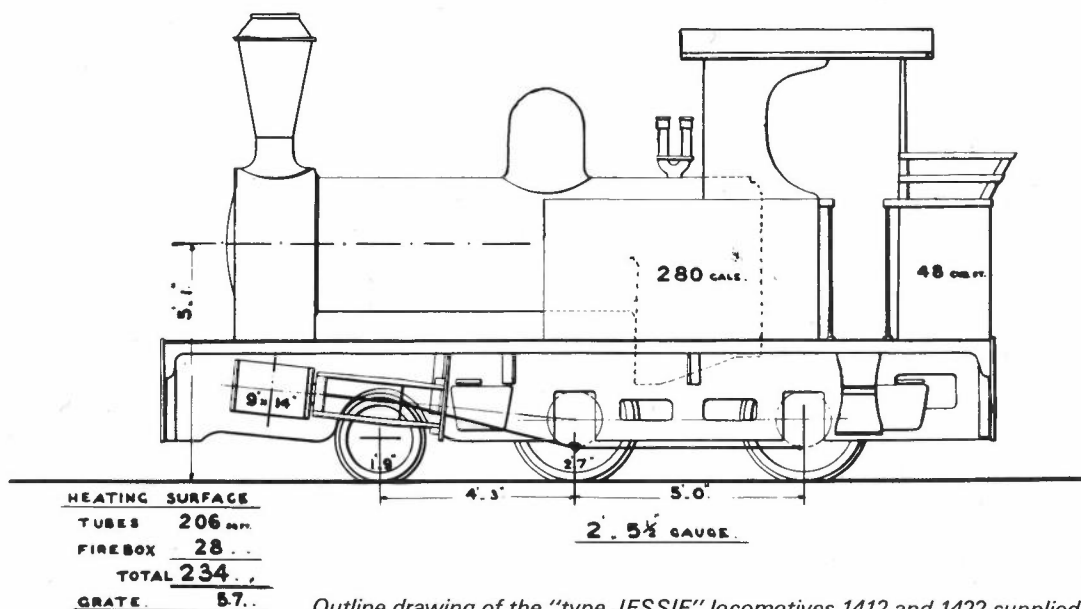
The engraving accompanying the article shows a locomotive with the name SIRDAR, but the works number 512, which differs from that given in the order books. The following dimensions are quoted, those marked * also being at variance with the order books:

Cylinders	: 5in x 12in*	Weight in working order	: 4tons 5cwt
Driving wheel diameter	: 1ft 3in	Heating surface—tubes	: 61 sq ft
Leading wheel diameter	: 1ft 0in	— firebox	: 21 sq ft
Fixed wheelbase	: 3ft 7in*	— total	: 82 sq ft
Total wheelbase	: 7ft 0in	Grate area	: 2.04 sq ft
Working pressure	: 150 lb/sq in (rather high for this type of locomotive at this date)		

Boiler feed was by one injector, and one eccentric driven feed pump from a tank, like 450-1 "mounted behind the footplate", it being intended to fire the engine on wood fuel. Because 511 SIRDAR was delivered in October 1883, it is presumed that it was 512, still the property of Bagnall, that was exhibited at Calcutta in early 1884 before being sold, through Stothert & Pitt, to an Indian customer. Walsh Lovett are known to have supplied portable railway equipment to the Indian army, and 511 may have been for this duty.

On the next locomotive, works number 646 of 1884, conventional side tanks replaced the earlier type of tank mounted where one would normally expect to find the bunker, and the locomotive was generally more robust in construction. Fitted with a copper firebox and brass tubes, LERMA cost £472/10/- (£472.50), and, together with another Bagnall (2-4-2 tank No 680) is thought to have been used on a railway in Mexico between Campeche City and Lerma, later part of the F.C.Unidos de Yucatan.

Locomotive 682 seems to have been a stock order. One of the order books states "Finished February 1885, but not despatched until May 1887". KARTOUM cost £425/5/- (£425.25) and was for J Terry & Co. Does the name give a clue to her destination? Similar circumstances seem to surround the next engine in our list, works number 700. The order date is quoted as February 1885 but, as FORTUNA, it was not delivered until May 1889, with a new works number, 1046, allocated more in line with this date. FORTUNA cost but £390 weighed 8 tons 10cwt in working order and, although sold to Bale & Edwards, in 1906 spares were ordered by Achilles Jesi, whoever they were.



Outline drawing of the "type JESSIE" locomotives 1412 and 1422 supplied to Brazil through Henry Rogers Sons & Co.
(collection A. C. Baker/T.D.A. Civil)

The next 2-4-0 tank design was a much larger machine, and introduced the use of outside frames and equalised spring gear. A copper firebox, brass tubes, and large spark arrester chimney completed the picture of JESSIE, thought to have been named after Bagnall's wife. After this design similar locomotives with 8in—9in cylinders were usually referred to as "Type JESSIE", but unfortunately it is not known where the prototype was destined.

Works numbers 1188/90/98, the next engines in the list, were all ordered by W A Stone. The name of 1188, MEZ O' HEGYES, is a town in south west Hungary, situated about 40 miles west of Szeged. Could it be that they were for use there? For the first time a steel firebox and steel tubes were used, and each locomotive cost £394/7/6 (£394.37 ½). One order book gives the gauge of the first two as 2ft 6 1/32in, but the unusual 2ft 3 5/8in gauge is always quoted for 1198. The total wheelbase in all cases was 6ft.

Works number 1212 was supplied to the Wolverhampton agent Henry Rogers Sons & Co, extremely good customers of Bagnalls over the years, and still in business today. All the locomotives ordered by them would be for use on sugar plantations in Pernambuco Province, Brazil. Costing £420, this locomotive was a very neat machine, and carried Rogers plate, with his number 748 instead of Bagnalls. Handbrakes only were fitted to these early 2-4-0's, and a single sandbox feeding sand onto the rails between the coupled wheels. Like many of its early sisters, 1212 had an eccentric driven pump, and Stephenson's link motion actuating slide valves, mounted over the cylinders, through rocking shafts. Disc wheels were fitted, and the total wheelbase was 7ft.

Works number 1258, which cost £469/9/6 (£469.47 ½), would be similar to 1212, but 1399 and 1412 were of the much larger "type JESSIE". Both of these locomotives, together with 1422, are thought to have been purchased by Rogers for use on the Usina Uniao sugar plantation railway in Pernambuco. 1399 had a 9ft 11in total wheelbase and cost £647, but for 1412 and 1422, costing £720 and £700 respectively, we have full dimensions:-

Cylinders	: 9in x 14in	Heating surface—tubes	: 206 sq ft
Driving wheel diameter	: 2ft 7in	—firebox	: 28 sq ft
Leading wheel diameter	: 1ft 9in	—total	: 234 sq ft
Fixed wheelbase	: 5ft 3in	Grate area	: 5.7 sq ft
Total wheelbase	: 9ft 3in	Working pressure	: 140 lb/sq in
Weight in working order	: 13tons 10cwt	Tractive effort at 85% of working pressure	: 4353 lb
Water capacity	: 280 galls		
Fuel capacity	: 48 cu ft		

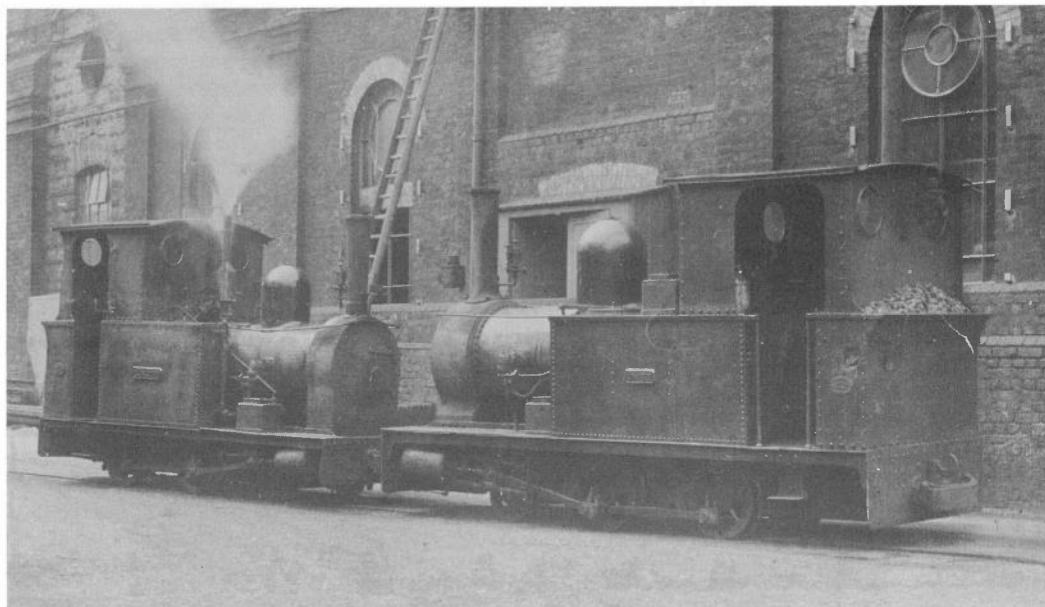
One would expect 1399 to be very similar.

The much larger locomotives 1418 and 1466 are a little out of place here, being of true narrow gauge passenger railway type. However, they are included because both are well known, having worked on the Jersey Railway. 1418 cost £1233/15/- (£1233.75), and seems to have received two new boilers during its lifetime, one in November 1907, and a second in September 1920. 1466, which cost £1345, received only one, delivered in October 1908. With these new boilers the elegant Salter spring balance safety valves disappeared, and were superseded by the more mundane Ramsbottom valves mounted on the firebox. Both locomotives survived until the railway closed in 1936, and were cut up during the following July.

MAURITIUS, works number 1419, was generally similar in outline to the "JESSIE" type but slightly smaller. It had inside frames, a large spark arrester chimney, a spartan cab roof consisting of but four pillars and a canopy, and a copper firebox and brass tubes. Although the order book quotes the customer as the Mauritius Estates Co, the general arrangement drawing quotes Mauritius Estates & Assets Co. It cost £573/6/- (£573.30).

Works numbers 1421 and 1534 were two very well known locomotives that spent all their lives working on the 3ft gauge system of the South Metropolitan Gas Co, Old Kent Road works, London; later part of the South Eastern Gas Board. This works closed in May 1953, and the pair were cut up in 1955. The two locomotives were almost identical in design to 1212, and the later Rye & Camber pair. They were built with a simple stovepipe chimney, which gave way in the 1930's to a ungainly spark arrester arrangement, but both later reverted to the original style. UNITY differed from CONCORD by having spoked leading wheels rather than the disc pattern. Two new boilers were supplied for these locomotives during their lifetime, but it is not known which engine received which. The first arrived in August 1934, and the second in September 1940. Originally both were fitted with a steel firebox and steel tubes, but a copper box and brass tubes were fitted into the boiler of UNITY in 1925-6, Bagnall having supplied a new firebox and tubes in March 1925. When new 1421 cost £425, and 1532 £555. The main dimensions were:

	1421	1534		1421	1534
Cylinders :	5 ½ in x 9 in	7 in x 11 in	Heating surface-tubes :	62.72	110 sq ft
Driving wheel dia :	1ft 6in	1ft 10in	— firebox :	16.14	21 sq ft
Leading wheel dia :	1ft 0in	1ft 0in	— total :	78.86	131 sq ft
Fixed wheelbase :	3ft 3in	3ft 3in	Working pressure :	150	150 lb/sq in
Total wheelbase :	6ft 3in	6ft 3in	Grate area :	3.06	4 sq ft
Water capacity :	140 galls	200 galls			
Fuel capacity :	16 cu ft	16 cu ft			



CONCORD, on the left, and UNITY at the South Eastern Gas Board, Old Kent Road Works in 1951. Note the slight difference in size between these two locomotives.

(G. Alliez, collection B.D. Stoyel)

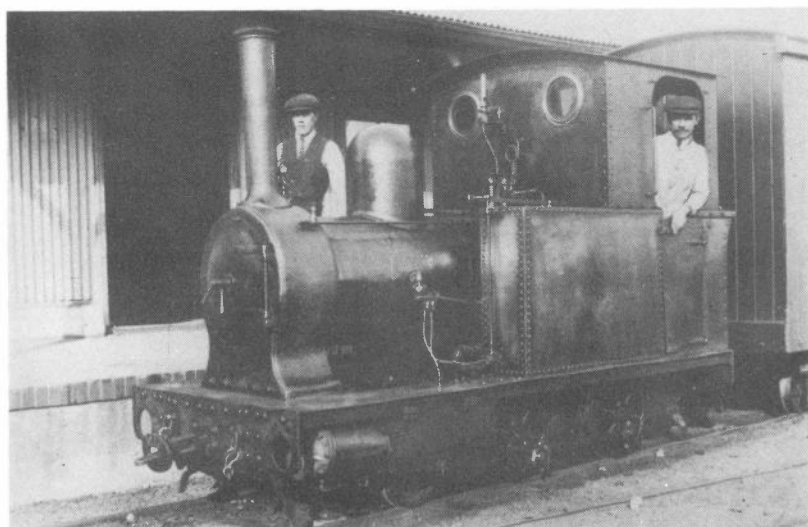
Commencing with works number 1454 Baguley's influence became noticeable, and we see for the first time the use of his patent valve gear on a 2-4-0. It seems almost certain that this locomotive, along with sister engine 1912, went to a sugar plantation in Brazil, possibly in Pernambuco province. Both were fitted with outside frames, a copper firebox and brass tubes, and large spark arrester chimneys. 1454 cost £580/9/4 (£580.47). The second locomotive, 1912, was unusual in being the only Bagnall locomotive to be fitted with Baguley patent valve gear after the introduction of Bagnall-Price valve gear in 1903. The leading dimensions of these two locomotives were:

Cylinders	: 7in x 11in	Heating surface—tubes	: 110 sq ft
Driving wheel diameter	: 1ft 9 ½ in	— firebox	: 21.65 sq ft
Leading wheel diameter	: 1ft 3in	— total	: 131.65 sq ft
Fixed wheelbase	: 4ft 6in	Grate area	: 3.85 sq ft
Total wheelbase	: 8ft 0in	Working pressure	: 140lb/sq in
Water capacity	: 215 galls	Weight in working order	: 8tons 10cwt
Fuel capacity	: 18 ½ cu ft		

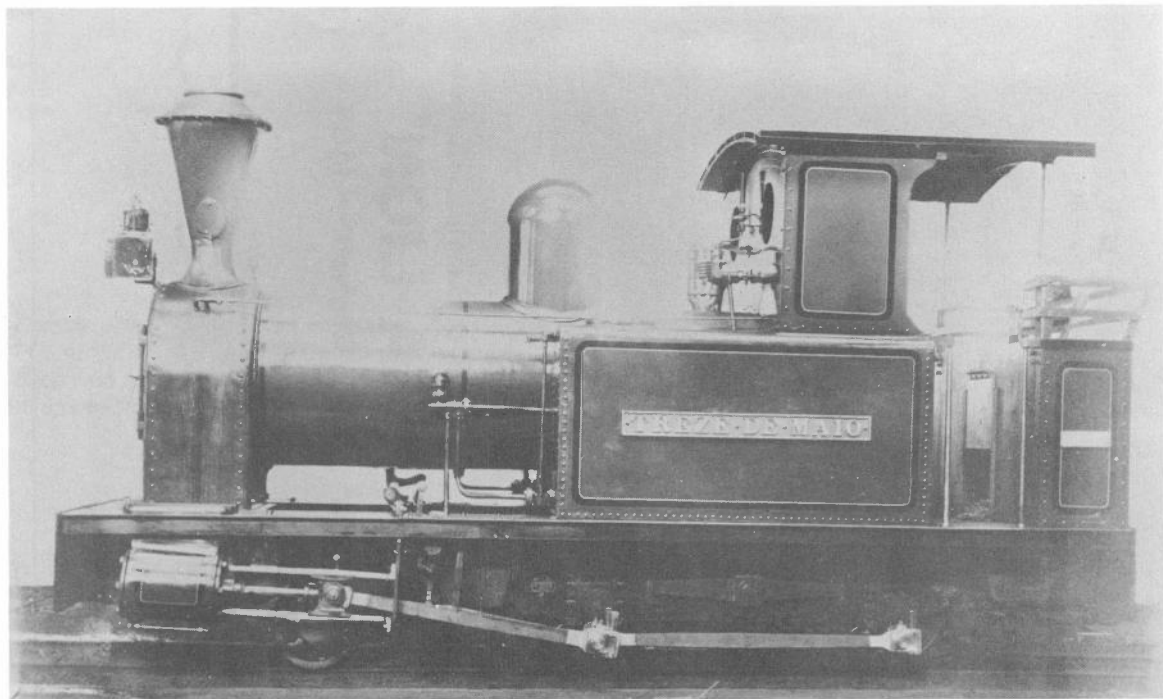
Next in the list is the first of the two well-known Rye & Camber Tramway locomotives, works numbers 1461 and 1511. They did the type of work Bagnall himself intended for this design, and the company also supplied the original coach, and some of the trackwork to this little Sussex railway. Although well into the Baguley period none of his design features were apparent. They were classic, delightful little machines, and whilst VICTORIA was a little larger than CAMBER, their dimensions were generally similar to 1421. CAMBER cost £404/7/6 (£404.37 ½), and VICTORIA £425, and each had a copper firebox, brass tubes, and motion skirts for protection against sand blown from the Camber beach and dunes. Their subsequent history is well known, and both eventually fell victim to the cutting torch.

Very similar to the Rye & Camber locomotives, but even smaller were the two supplied to the Groudle Glen Railway in the Isle of Man. However, on these examples both Baguley and Bagnall patent valve gears were used, together with the Baguley feature of a circular steel firebox—by this time standard practice on the smaller narrow gauge industrial types. The first engine, 1484 SEA LION, cost £355, and had the Baguley arrangement of valve motion, whilst 1781, named POLAR BEAR, had Bagnall-Price motion but cost the same. Bagnall records show that SEA LION was rebuilt in April 1907, which fits in nicely with the arrival of POLAR BEAR. Unfortunately, it is not clear whether the work was undertaken by Bagnall's men in the Isle of Man, or more likely, that the locomotive was returned to Stafford.

Spare boilers were sent out in March 1928 for 1484, and in March 1930 for 1781. The later history of these two locomotives is too well known to record here, and both are happily preserved.



*Rye & Camber Tramway CAMBER standing at Golf Links Halt in 1924.
(collection E.A. Wade)*



*TREZE DE MAIO as completed ready for delivery to Brazil, with spark arrester, Baguley valve gear and spring equalising beams.
(collection A.C.Baker/T.D.A.Civil)*

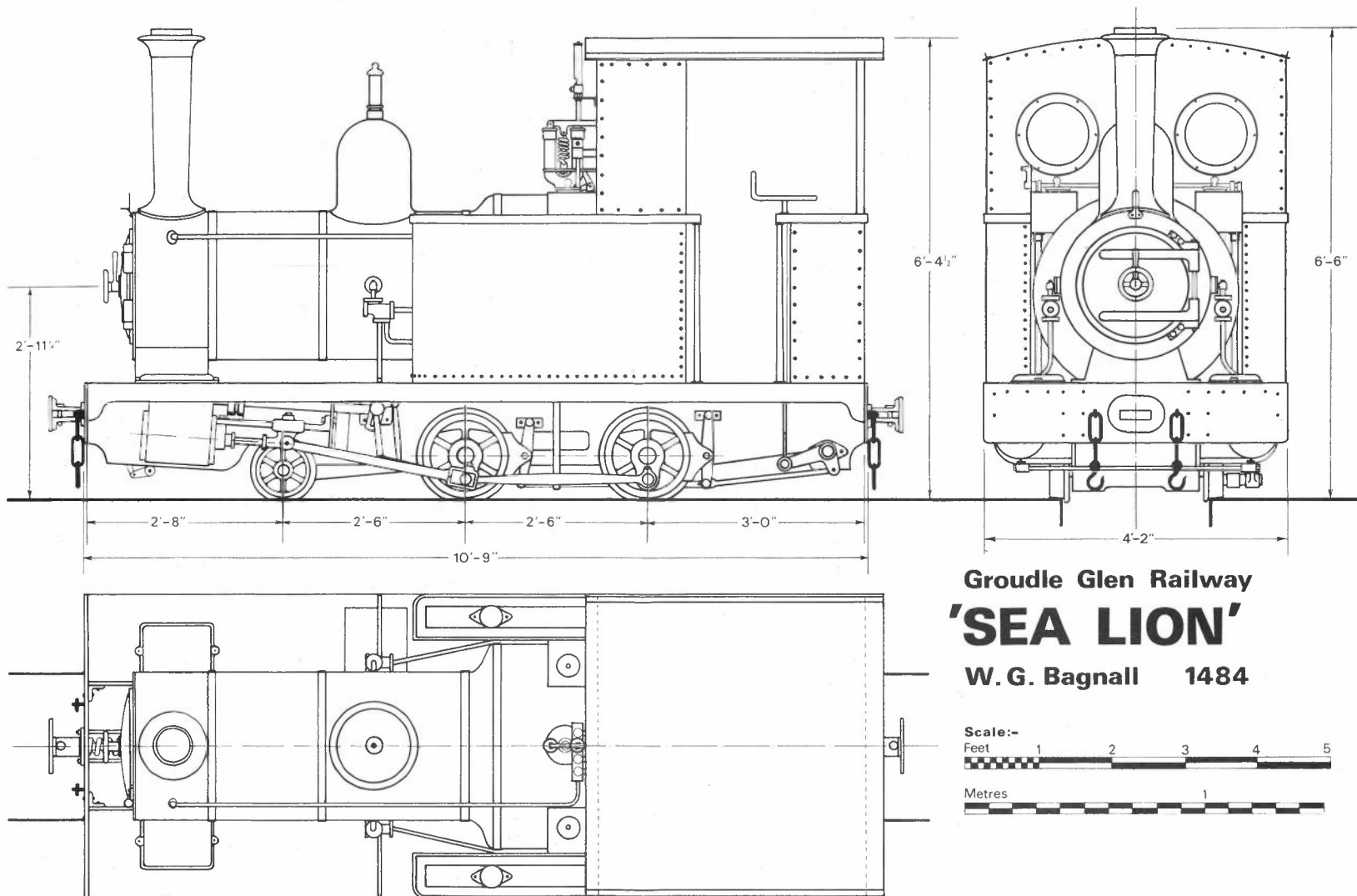
We next come to perhaps the most famous of all the Bagnall 2-4-0 tanks. Works number 1497 was originally ordered on 10th June 1896, for 2ft 5½in gauge on some Brazilian estates belonging to Collier Antunes & Co, and, when completed, was photographed carrying the name TREZE DE MAIO. (13th May in Portuguese, the date on which slavery was abolished in Brazil). In most respects this locomotive was of the "type JESSIE", but Baguley valve gear appeared for the first time on a locomotive to this variant of the basic concept. For a reason or reasons unknown the original order was cancelled when the locomotive was ready for delivery, and she was left on the maker's hands. They sold her in August 1897, after conversion to 2ft 3in gauge, to the Plynlimon & Hafan Tramway Co, Talybont, Cardigan, for £673/15/- (£673.75). The subsequent history of this locomotive has been described many times, and there is little point in repeating it here, except to record that it survived a further change of gauge, this time to 1ft 11.5/8in, to end its days on the Vale of Rheidol Railway at Aberystwyth.

Works numbers 1565 of 1898, and 1774 of 1904 were almost identical, being ordered for sugar estates in Brazil by a firm of Lisbon agents, who changed their name between these two orders.

Inside frames and Baguley valve gear were fitted to the first engine, but the second had Bagnall-Price valve gear. A copper firebox and brass tubes were utilised, together with a cylindrical smokebox mounted on a cast saddle rather than the normal wrapper type box. RIO DO OURA sported a large spark arrester chimney, but SANTA CLARA had the normal cast pattern. Both locomotives had a simple pillar and canopy cab. Bagnall builders plates were replaced by plates that gave the agents name, with an address of 41-43, Avenida Da Liberdade, Lisbon. 1565 cost £553 whilst 1774 cost £570. There was not much inflation then! It is strange that Bagnalls considered it worthwhile to redesign the second engine to fit Bagnall-Price valve gear, since in the case of works number 1912, built much later, they retained Baguley gear. Could this have been at the insistence of the customer? The leading dimensions of these two locomotives were:

Cylinders : 8in x 12in
Driving wheel dia : 2ft 2½in
Leading wheel dia : 1ft 4in
Fixed wheelbase : 4ft 0in
Total wheelbase : 7ft 6in

Heating surface— total : 182.75 sq ft
Grate area : 4.37 sq ft
Working pressure : 140 lb/sq in
Water capacity : 230 galls
Weight in working order : 10tons 10cwt



Groudle Glen Railway
'SEA LION'
 W. G. Bagnall 1484

Scale:-

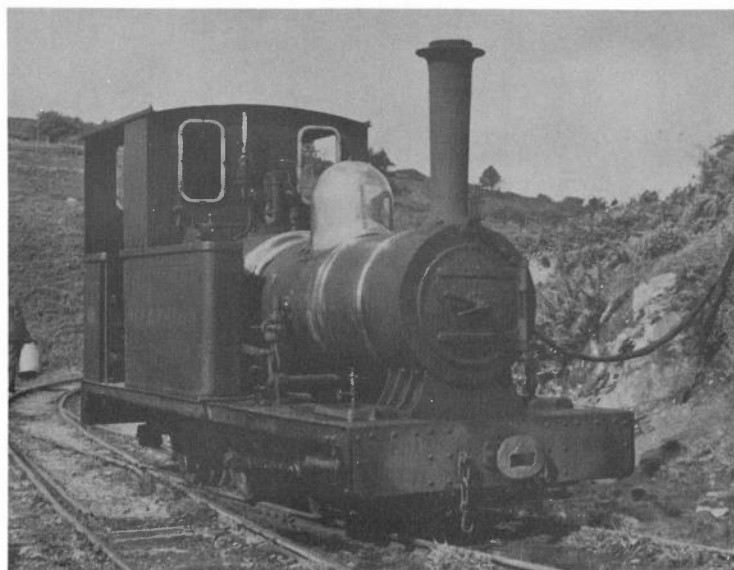
Feet 1 2 3 4 5

Metres 1

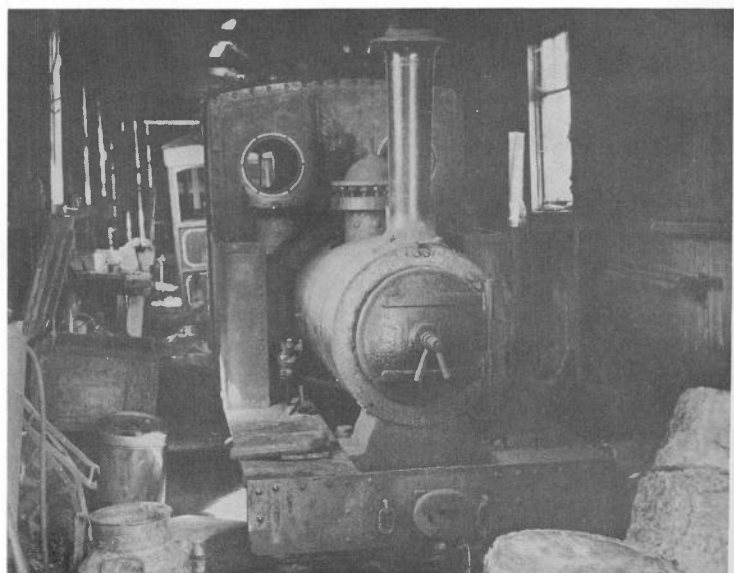
*Groudle Glen Railway, Isle of Man:
POLAR BEAR approaching Headland
Loop with a train during the last years
of operation. (F. Jones)*

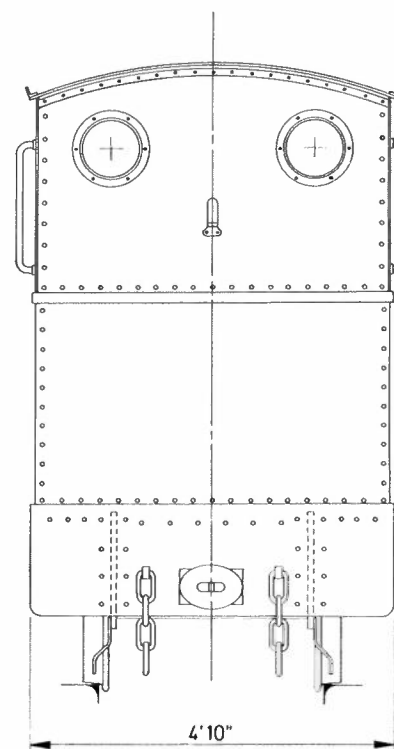
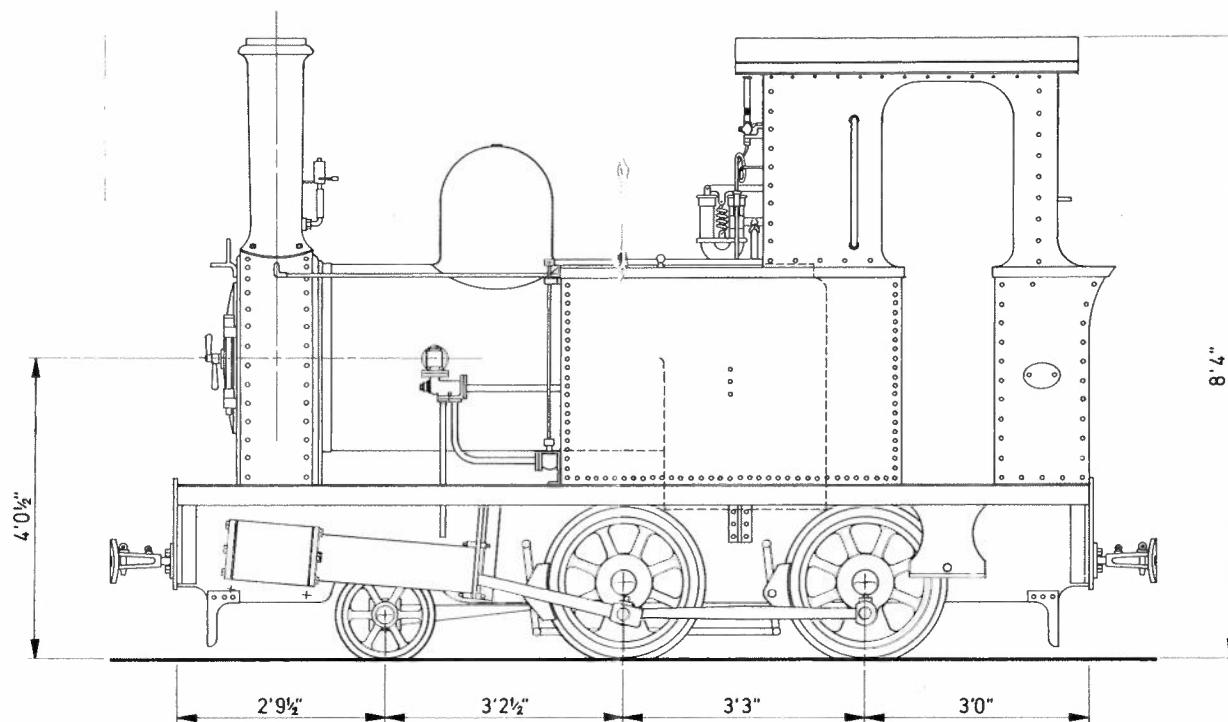
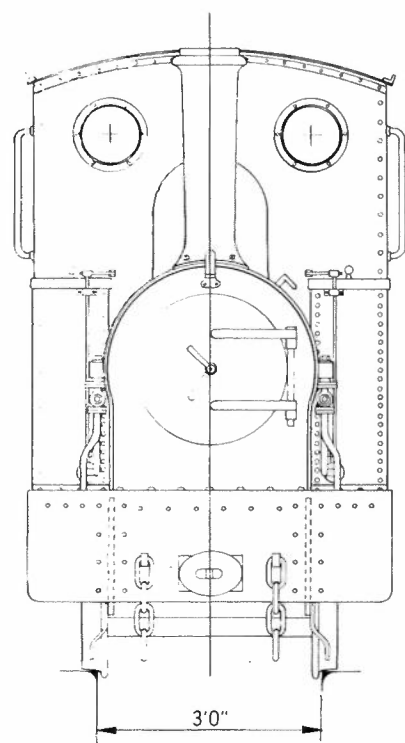


*POLAR BEAR taking water from the
tank at Headland Loop. (F. Jones)*



*SEA LION as most visitors remember
her, standing in the back of the shed
partly dismantled for more than
twenty years. (F. Jones)*

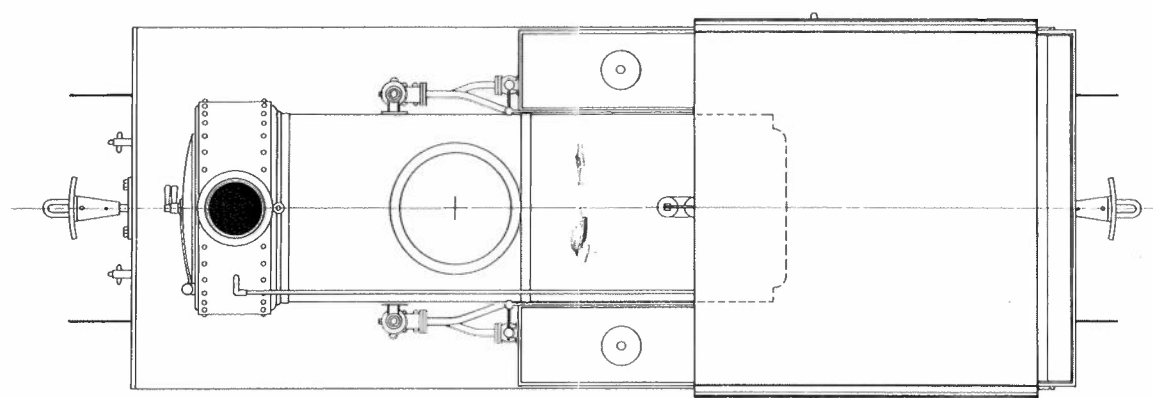




NOTES

Reproduced from maker's drawings and photographic evidence.

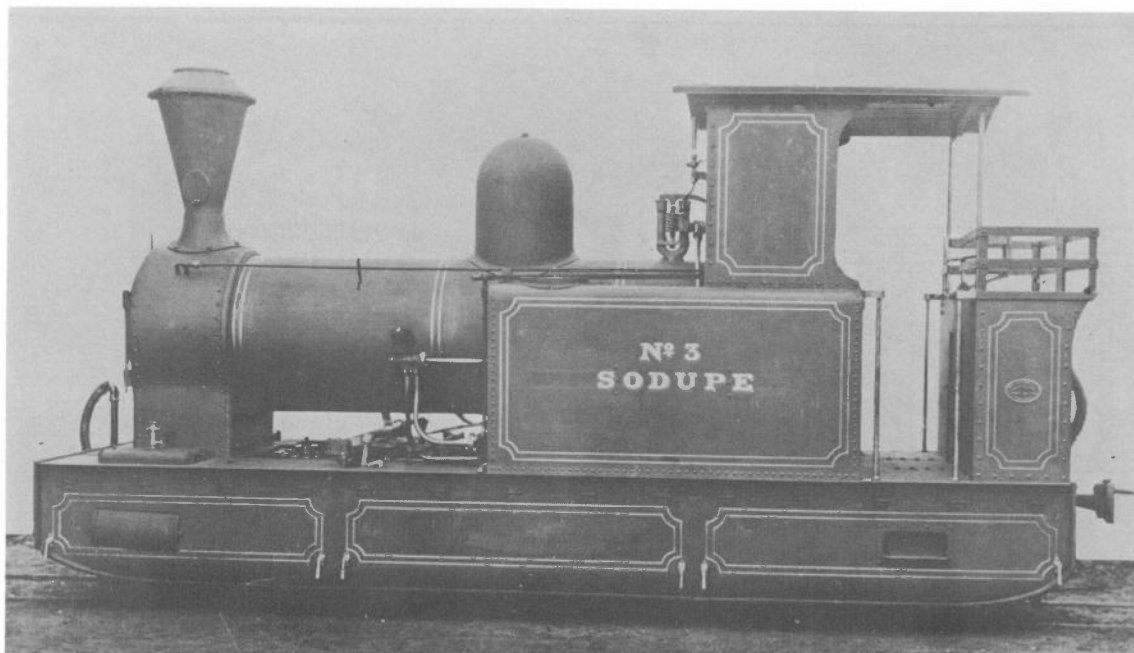
Safety chains omitted from side elevation.



W.G. Bagnall, Ltd. **Works No. - 1511** **2-4-0T Built 1897**

'VICTORIA' of the Rye & Camber Tramway
 Cylinders - 6"bore x 10"stroke Gauge-3'0"
 Wheel diameters - pony 1'2" driving 2'0 1/2"
 Weight in working order - 6tons 12cwt
 Boiler pressure - 140p.s.i.
 Tank capacity - 100gallons

© E.A.Wade 5/1979



SODUPE, a "type JESSIE" with full motion skirts and vacuum brake might have worked on a roadside tramway.
(collection A. C. Baker/ T. D. A. Civil)

Two more "type JESSIE" locomotives followed, very similar to works number 1497, and fitted with Baguley valve gear, copper fireboxes, and brass tubes. Works numbers 1615-6 cost £800 each, were ordered by a Spanish firm, and although their destination is not known the second carried the name of a village near Bilbao in Northern Spain. They had full length motion covers, a spark arrester chimney, and were fitted with the vacuum brake. In addition to the name SODUPE, 1616 carried the running number 3, and presumably 1615 likewise had a running number. A vacuum braked bogie coach was also delivered with this pair of locomotives.

In works number 1684 we have yet another "type JESSIE", this time ordered by London agents L Mitchell for a Mauritius sugar plantation. Baguley valve gear, a copper firebox and brass tubes were again used, and the cost was £650. This was one of several locomotives ordered by Mitchell about this time for supply to Mauritius through Les Forges et Fonderies, but it is not certain for which estate each was destined.

In the next few years three engines were ordered by Jacob Walter & Co, giving a London address, and all were shipped to Rio de Janeiro for use at some Brazilian mines. The first, works number 1679, was essentially a "type JESSIE" fitted with a full cab, spark arrester, Baguley valve gear, crosshead driven boiler feed pump, and cost £800. The other two locomotives, works numbers 1762 and 1783, were entirely different, with inside frames, Bagnall-Price valve gear and, surprisingly, a circular steel firebox and steel tubes.

This boiler arrangement had previously only been used on the Groudle Glen 2-4-0 tanks, and in this case may have helped to conform to the reduced loading gauge, only 7ft 11 1/4 in from rail level to chimney top. Boiler mountings and cab were cut down, and the rear footplate dropped to 1ft 8 in from the rail. The smokeboxes were mounted in cast saddles, and a sandbox was mounted centrally on the boiler. Brass plates on the cab sides carried the legend C.M.Q.M. As new, 1762 cost £585 and 1783 £670, The main dimensions were:

	1762	1783		1762	1783
Cylinders	: 9in x 14in	9 1/2 in x 14in	Heating surface—tubes	: 224.7	216 sq ft
Driving wheel dia	: 2ft 3 1/2 in		— firebox:	21.3	23.25 sq ft
Leading wheel dia	: 1ft 7in		— total:	246	239.25 sq ft
Fixed wheelbase	: 4ft 0in		Grate area	: 5.5	6.0 sq ft
Total wheelbase	: 8ft 6in		Working pressure	: 150 lb/sq in	
Water capacity	: 300 galls		Weight in working order	: 12tons	
Fuel capacity	: 23 cu ft				



SANTA THEREZA, one of the largest of the 2-4-0 tanks, had a raised, circular firebox, extended side tanks, and Bagnall-Price valve gear. (collection A.C. Baker / T.D.A. Civil)



In 1976 SANTA THEREZA was still hard at work, still carrying its Bagnall works plate and name, but barely recognisable in its new guise. (D. Trevor Rowe)

The next two locomotives were almost identical to those for Jacob Walter, but, being built to normal loading gauge, were just a little bigger. The Bagnall-Price valve gear, and the circular firebox were retained. Works number 1800 was the first of many Bagnall locomotives built for the Tongaat Sugar Co, of Tongaat, Natal, but all the others were to a new 4-4-0 design that was destined to replace the 2-4-0. TONGAAT cost £690 and survived until it was scrapped in 1932. An almost identical twin, works number 1906, was recently located still in use at Usina Santa Thereza, a sugar plantation in Pernambuco Province, Brazil. However, she has been converted to an 0-6-0 wheel arrangement by substituting an additional pair of driving wheels for the leading truck, and a continental style boiler has replaced the original. She was still there in November 1976 carrying the running number 6. The dimensions of these two locomotives were almost identical to works number 1783.

The last of the type are three locomotives built for the 2ft 6in gauge lines of the Eastern Bengal Railway, India, and in many ways they were a reversion to earlier outlines. However, under this disguise were several



*Almost identical twins at Shantipur Jc. in November 1978. 776 is Bagnall 2540/1935 but the leading locomotive 774 is Yorkshire Engine Co. 2320/1935.
(L. G. Marshall)*

innovations, including superheaters, piston valves and a sight feed lubricator in the cab. A normal type of locomotive boiler was used, with a copper firebox and steel tubes. The engines also had Bagnall-Price valve gear, electric lighting powered by a Pyle National turbo-generator and a double cab roof. Design and construction was under the direction of the London consulting engineer, Rendel, Palmer & Tritton. As Eastern Bengal Railway 10, 15 and 16, Bagnall 2306, 2539-40 appear to have been built for use on two lines; one from Shantipur to Nabadwip Ghat via Krishnagar City, a little north of Calcutta, and the second from Rupsa East to Bagerhat. This latter passed to East Pakistan on partition, and now forms part of the Bangladash Railways. It was converted to broad gauge in 1970, and 2539, which had been withdrawn from service there in 1966, was preserved at Saidpur workshops of the Bangladash Railways in 1973, and may still be there.

The other two locomotives are still in use as Indian Railways, Eastern Railway, class CS number 773 (2306), and 776 (2540) on the Shantipur line. However, like many Indian steam locomotives they bear the unmistakable signs of many years of hard work on the partly road side tramway, and despite having superheaters aspire to no power braking whatsoever! It is interesting to note that two further locomotives were built to this design by the Yorkshire Engine Co Ltd of Sheffield in 1935 (YE 2320-1). They are unusual in being among the few locomotives not built by Bagnalls that were fitted with Bagnall-Price valve gear. They were E.B.R 12-3 and still survive with their Bagnall sisters at Shantipur as Indian Railways 774-5. These four are the smallest steam locomotives still in use on Indian Railways, and their main dimensions are:

Cylinders	: 8½ in × 12 in	Heating surface—tubes	: 138.5 sq ft
Driving wheel dia	: 2ft 0 in	— firebox	: 28 sq ft
Leading wheel dia	: 1ft 4 in	— superheater	: 22.5 sq ft
Fixed wheelbase	: 4ft 0 in	— total	: 189 sq ft
Total wheelbase	: 8ft 0 in	Grate area	: 4.4 sq ft
Water capacity	: 260 galls	Working pressure	: 150 lb/sq in
Fuel capacity	: 16 cu ft	Weight in working order	: 11tons 15cwt

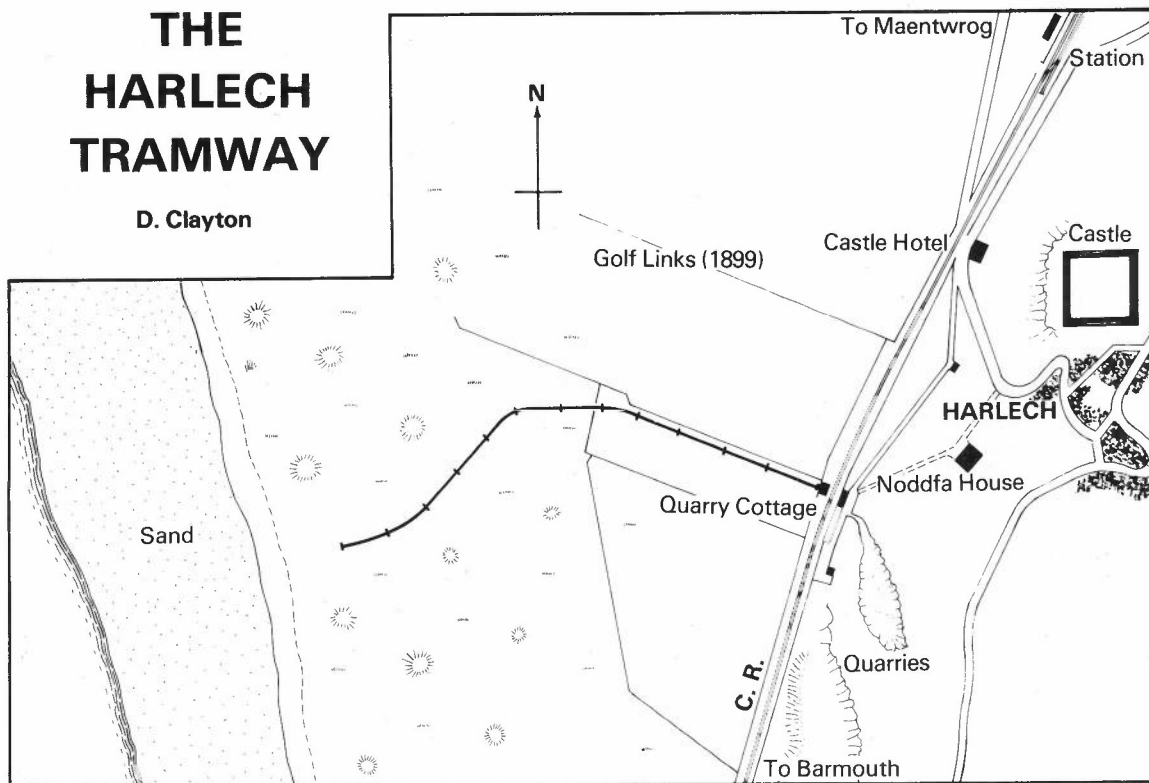
So, after more than fifty years, production of a distinctive Bagnall locomotive type ended. They were an extremely interesting and diverse collection, but several are still showing their worth even today. In conclusion I would like to thank the many people who have, over the years, helped me to collect this information on Bagnall products, especially my co-author of *Bagnalls of Stafford*, T D Allen Civil; also H C Hughes, John Kirchner, and B Derek Stoyel, the photographers and artists who have provided illustrations, and, of course, G E C Traction Ltd, the successors to W G Bagnall Ltd.

LIST OF BAGNALL 2-4-OT LOCOMOTIVES BUILT 1882-1935:

<i>Works number</i>	<i>Order date</i>	<i>Delivery date</i>	<i>Cylinders dia x stroke</i>	<i>Driving wheel dia</i>	<i>Fixed wheel-base</i>	<i>Name</i>	<i>Customer</i>	<i>Gauge</i>
450	6/1882	9/1882	7" x 10 ½"		5' 0"	RIATO	G.B. Toms & Co	3' 0"
451	6/1882	9/1882	7" x 10 ½"		5' 0"	CUBA	G.B. Toms & Co	3' 0"
511	1/1883	10/1883	5" x 7 ½"		3' 0"	SIRDAR	Walsh Lovett & Co, for India	2' 0"
512	1/1883	2/1886	5" x 7 ½"		3' 0"	SOUDAN	Stothert & Pitt, for India	2' 0"
646	5/1884	11/1884	6" x 9"		3' 9"	LERMA	Ybarrondo	3' 0"
682	11/1884	5/1887	5 ½" x 9"		3' 6"	KARTOUM	J. Terry & Co	3' 0"
700	2/1885	5/1889	6 ½" x 10"		3' 6"	FORTUNA	Bale & Edwards	2' 5 ½"
842	11/1886	2/1887	7" x 10 ½"	1' 9"	5' 0"	BARONEZA	Henry Rogers Sons & Co, for Pernambuco, Brazil	2' 6"
950	11/1887	11/1888	9" x 13 ½"		4' 0"	JESSIE	F. Cretzberg	2' 7 ½"
1188	23/7/1889	11/1889	6" x 9"		3' 0"	MEZ O' HEGYES	W.A. Stone	2' 6"
1190	19/8/1889	11/1889	6" x 9"		3' 0"	PERCY	W.A. Stone	2' 6"
1198	19/8/1889	11/1889	6" x 9"		3' 0"	—	W.A. Stone	2' 3 5/8"
1212	9/1889	1/1890	6" x 9"		3' 8"	Cde de FIGEIREDO	Henry Rogers Sons & Co	1' 11 5/8"
1258	12/1889	3/1890	6" x 9"		3' 8"	—	Dieckmann	2' 5 ½"
1399	23/11/1891	2/1892	8" x 12"	2' 0"	4' 11"	FRATERINDADE	Henry Rogers Sons & Co, for Pernambuco, Brazil	2' 5 ½"
1412	6/3/1892	6/1892	9" x 14"	2' 7"	5' 3"	UNIAO	Henry Rogers Sons & Co	2' 5 ½"
1418	30/12/1892	6/1893	13" x 20"	3' 6"	7' 0"	CORBIERE	Jersey Railway Co	3' 6"
1419	14/1/1893	4/1893	8" x 12"	2' 2 ½"	5' 0"	MAURITIUS	Mauritius Estates Co	3' 0"
1421	18/4/1893	10/1893	5 ½" x 9"	1' 6"	3' 3"	CONCORD	South Metro Gas Co, Old Kent Road Works, London	3' 0"
1422	21/4/1893	7/1893	9" x 14"	2' 7"	5' 3"	TRIUMPHO	Henry Rogers Sons & Co, for Pernambuco, Brazil	2' 5 ½"
1454	8/4/1895	7/1895	7" x 11"	1' 9 ½"	4' 6"	TEIMOSA	A.B. Ghewey, for Bowman Heirs	1' 11 5/8"
1461	15/5/1895	11/1895	5 ½" x 9"	1' 8"	3' 0"	CAMBER	Rye & Camber Tramway	3' 0"
1466	19/8/1895	1/1896	13" x 20"	3' 6"	7' 0"	ST BRELADES	Jersey Railway Co	3' 6"
1484	19/2/1896	5/1896	4 ½" x 7 ½"	1' 2"	2' 6"	SEA LION	R.M. Broadbent, Groudle Glen Railway, Isle of Man	2' 0"
1497	10/6/1896	2/1897	8" x 12"	2' 3"	5' 0"	TALYBONT	Plynlimon & Hafan Tramway	2' 3"
1511	10/4/1897	6/1897	6" x 10"	2' 0 ½"	3' 0"	VICTORIA	Rye & Camber Tramway	3' 0"
1534	1/2/1898	8/1898	7" x 11"	1' 10"	3' 3"	UNITY	South Metro Gas Co, Old Kent Road Works, London	3' 0"
1565	21/11/1898	7/1899	8" x 12"	2' 2 ½"	4' 0"	RIO DO OURA	J.M. Sumner & Co. Lisbon	2' 9"
1615	3/4/1900	12/1900	8" x 12"	2' 3"	5' 0"	ARC ENIEGA	Rosing Bros, Materials de Construction, Zaragoza, Spain	1' 11 5/8"
1616	3/4/1900	10/1900	8" x 12"	2' 3"	5' 0"	SODUPE No 3	Jacob Walter & Co, Companhia Oeste de Mines, Brazil	1' 11 5/8"
1679	28/11/1901	1/1902	9" x 14"	2' 2"	5' 0"	JACOB WALTER	Jacob Walter & Co, Companhia Oeste de Mines, Brazil	1' 11 5/8"
1684	1/2/1902	5/1902	8" x 12"	2' 0 ½"	4' 0"	No 3	L. Mitchell, for Les Forges & Foundries, Mauritius	2' 7 ½"
1762	20/8/1904	10/1904	9" x 14"	2' 3 ½"	4' 0"	DOUTOR HEILBRON	Jacob Walter & Co, Companhia Oeste de Mines, Brazil	1' 11 5/8"
1774	30/11/1904	2/1905	8" x 12"	2' 2 ½"	4' 0"	SANTA CLARA	Whitehead Sumner Harker & Co	2' 9"
1781	6/3/1905	6/1905	5" x 7 ½"	1' 3 ¼"	2' 6"	POLAR BEAR	Howstrake Estates Ltd, Groudle Glen Rly, Isle of Man	2' 0"
1783	15/3/1905	5/1905	9 ¼" x 14"	2' 3 ½"	4' 0"	Dor ARQUINI	Jacob Walter & Co, Companhia Oeste de Mines, Brazil	1' 11 5/8"
1800	12/2/1906	8/1906	9" x 14"	2' 3 ½"	4' 0"	TONGAAT	Tonga Sugar Co, Tongaat Estate, South Africa	2' 0"
1906	4/7/1909	/1909	9" x 14"	2' 3 ½"	4' 0"	SANTA THEREZA	Herdeiros Bowman Ltd, for Usina Santa Thereza, Pernambuco, Brazil	2' 5 ½"
1912	25/10/1909	/1910	7" x 11"	1' 9 ½"	4' 6"	TEIMOSA 2A	Herdeiros Bowman Ltd, for Brazil	1' 11 5/8"
2306	19/6/1926	18/3/1927	8 ½" x 12"	2' 0 ½"	4' 0"	10	Eastern Bengal Railway	2' 6"
2539	19/7/1935	11/1935	8 ½" x 12"	2' 0 ½"	4' 0"	15	Eastern Bengal Railway	2' 6"
2540	19/7/1935	11/1935	8 ½" x 12"	2' 0 ½"	4' 0"	16	Eastern Bengal Railway	2' 6"

THE HARLECH TRAMWAY

D. Clayton



More than twenty years back, when researching a completely different subject, I discovered some references to this little-known line, which operated in North Wales a century ago. Subsequently, in *Narrow Gauge Railways in Mid-Wales*, (Oakwood Press, 1970), J I C Boyd included a brief note and map, but this showed the route running southwards along the east side of the Cambrian Railway instead of west towards the beach. One can do no better than repeat the information published in the *Carnarvon and Denbigh Herald*, 27th April 1878:

"Mr S Holland MP is defraying the cost of opening a narrow gauge railway from Harlech to its beautiful and extensive beach. A movement which no doubt will render this picturesque watering place a favourable summer resort."

and later more extensively in the same issue:

"THE NARROW GAUGE RAILWAY: The construction of this little railway, or rather tramway (as we understand the carriages are to be drawn by horses) has been let to Mr Godfrey Morton of Tremadoc. The length, from the Cambrian Railway to the beach, will be six hundred yards, and by the terms of the contract it is to be finished by the middle of June, but the contractor hopes to have it finished a week or so before that time, so that the little line will be in full swing before the great influx of visitors has commenced. We understand that there is to be a refreshment room at the beach end of the tramroad, with bathing machines for both ladies and gentlemen, which will be under the management of Mr Lovegrove, of the Harlech Castle Hotel. The Engineer is Mr Thomas Roberts, of Portmadoc. The Harlech beach is noted for its hard, sandy bottom, and if required the line can be extended both ways along the beach without much expenditure beyond the cost of laying down sleepers and rails. Mr Samuel Holland, MP for Merionethshire, is defraying the cost of this venture. The first sod of the tramway was cut on Good Friday. It has been suggested the water power now running to waste might be utilised to raise goods from the station to the town, thereby effecting a great saving besides being a great benefit to the poor horses now engaged in the work."

The same paper carried an optimistic report on May 18th:

"THE TRAMWAY: The little tramway from Harlech to the coast is being finished very rapidly. As far as the permanent way is concerned, it will be finished at the end of the month."

Only one further reference seems to have been made to this line, in the issue for June 29th:

"THE TRAMWAY: The permanent way is now finished and has been handed over by the contractor to the

proprietor. Mr Rees Evans, builder, Harlech is making the 'rolling stock' and the inhabitants expect to see the thing in full operation in the course of a few days."

Curiously, its opening and subsequent operation seems to have been ignored by the newspapers. Although *Gossiping Guides to Wales*, 1880 does not refer to the tramway, it does state under the heading: "New Hotel: The Castle Hotel was recently erected by Mr Samuel Holland," so it is not surprising to learn that Mr Lovegrove was the Manager. He may also have had some supervision over the tramway, but this is uncertain. The *Postal Directory of Merionethshire and Montgomeryshire*, published at Liverpool in 1886, under Harlech states: "TRAMCAR (Horse) from Noddfa House to Beach." "The Beach which is three quarters of a mile from the town is gained by a small tramcar, which commences to run at 7.30 am, and ceases at 8.30 pm."

Jenkinson's directory of 1878, and Murrays directory of 1885 refer only to the hotel, and make no mention of the tramway, and the *Gossiping Guide to Wales* 1891 merely states that the sea is one mile from the town, again with no reference to a tramway. *Narrow Gauge Railways in Mid-Wales* records that the Gossiping Guide of 1890 notes: "The sea is almost a mile from the town and the bathing place can be approached by tramcar from near the Railway Station; but in some summers the tramway has not been used," and that according to an old inhabitant the line ceased about 1883. This conflicts with the Postal Directory of 1886, and maps surveyed in 1887 mark the line as "Tramway", presumably because it was in use, not "Tramway (Disused)", the normal indication if the track was in position but out of use.

These are the only published references so far discovered, though in the Breese, Jones and Casson records held by the Gwynedd County archives in Caernarfon is a bundle marked: Thomas Roberts, Portmadoc, and relating to work for Samuel Holland. One account dated 23rd Dec 1877 to 6 Sept 1878 states:

"Railway: 1878	Feb 8	Rees Evans for Timber	29-0-0
	May 9	Godfrey Morton on a/c	40-0-0
	June 10	Godfrey Morton on a/c	60-0-0
	July 11	Godfrey Morton balance	10-0-0
			<u>£139-0-0</u>

and a final paper headed 'Payments' one is of interest:

"Sept 6 Thomas Roberts: To preparing plans, specifications, estimates, letting and superintending Railway; Buildings and improvements (including 36 journeys to Harlech) £1147-14-7 (£1147.73) at 5% = £57-7-8 (£57.58)
By Cash on account 15-0-0
£42-7-8 (£42.38)

There is also a letter from the Cambrian Railways dated 21st May 1878, apparently in connection with the cottage which might have been on the railway company's land, but an accompanying map of the proposed tramway shows S Holland MP as the owner of the land on which the line would be built.

Tantalisingly, this is as far as written evidence takes us. The track gauge is not known, but one can surmise that it would be nominally 2ft. The car, or cars, seem to have been built locally by Mr Rees Evans, so the sum of £29 may only represent a part cost of the rolling stock. Wheels and axles, bearings and or other metal parts could have been standard quarry wagon parts supplied from one of Hollands other businesses. From the description of the line there was probably only one car, no doubt pulled by a horse hired from a local farmer, or perhaps from the hotel if they had livery stables.

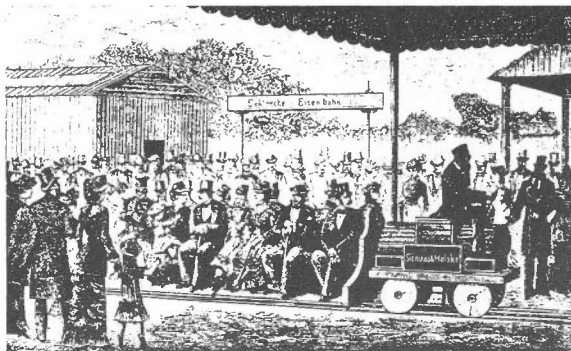
After only a few months under construction, the line seems to have opened in July 1878, but its closure is much more uncertain. The 1887 survey could be in error by implying that the line was still in use, and the evidence of the guides and directories is inconclusive. Anyway, it had clearly been lifted when the 1899 survey was carried out, because this shows no indication of the line. The track was presumably laid more or less on the surface of the ground, mainly sand dunes in this area, and any traces would soon disappear. The track might have gone to a quarry, although that connected with Holland had been taken over by Oakeley. There is no clue as to the fate of the car, but could it have been one of those used at Fairbourne? It is not really surprising that the Harlech Tramway had such a short life. The length of the line was such that it would have been almost as quick to walk, and the number of visitors to the town may have been insufficient to justify such a service, except perhaps for the brief summer season.

In conclusion, the author gratefully acknowledges the permission given by Mr L G Heywood, Librarian, and Mr A Giles Jones, Archivist at the University College of North Wales Library at Bangor, to see the many North Wales guide books of the period, and Mr Bryn R Parry of Gwynedd County Archives Service, Caernarfon to scan through the Breese, Jones and Casson collection. Their willing assistance, and that of their staff in locating many of these documents has enabled some light to be shed on this line. Naturally, any further information would be most welcome.

100 YEARS OF NARROW GAUGE ELECTRIC RAILWAYS

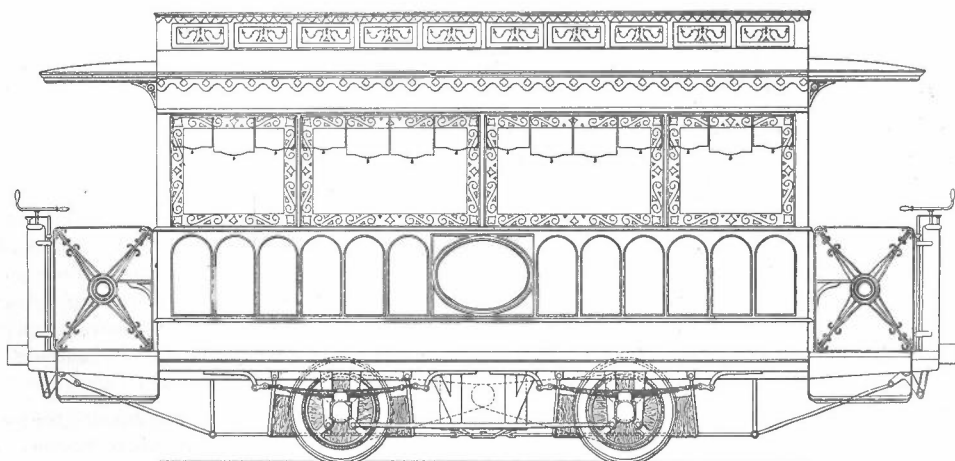
Bryan W. Rayner & Brian Webb

A contemporary engraving of the Siemens electric railway at the Berlin Exhibition. (collection R. Butterell)

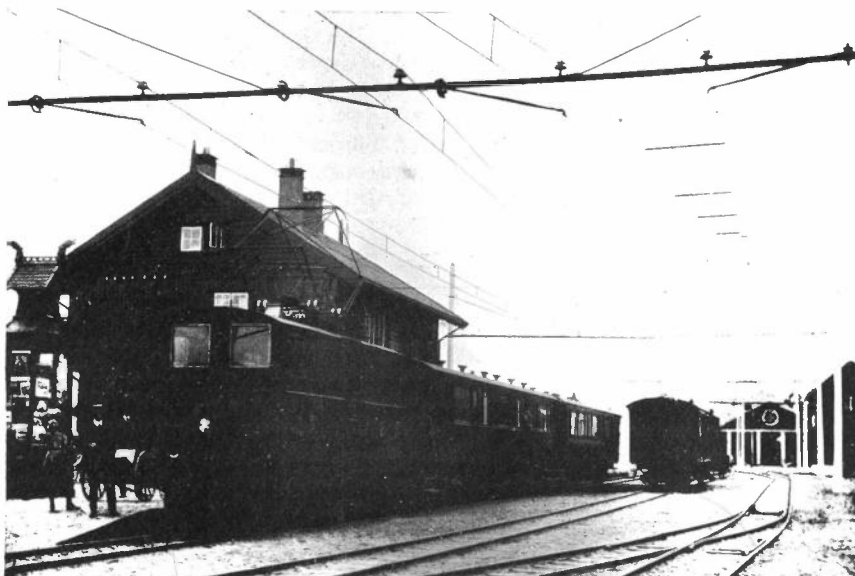


Electric railways are now commonplace, providing fast, economical transport of people and freight on every continent. But, like many facets of modern life, they grew from almost insignificant experiments. Early developments used batteries as a power source, but these severely limited the load that could be hauled, and it was only the invention of the dynamo that enabled full advantage to be taken of the great potential of electricity. At the same time the narrow gauge railway was becoming accepted, and it was therefore natural that these two developments should come together in 1879. Electric power has continued to provide the power source for many narrow gauge railways over the past century, and they have also been used to prove many new ideas.

The first successful public electric railway was a demonstration line shown by Siemens & Halske at the Berlin Trades Exhibition, which was open from the 31st May to 30th September 1879. The 60cm gauge line was 300 yards long, and was equipped with a centre third rail for a 150 volt power supply, the return being through the running rails. Electricity was generated by a Siemens dynamo driven by a Dolgorouki rotary steam engine. The locomotive, designed by Werner von Siemens, consisted of a four wheel frame on which a 3 hp traction motor was mounted lengthwise, driving the wheels through a series of direct reduction gears. The driver sat on top of the motor casing. Three open cars, each capable of seating six passengers back-to-back, were hauled at 4 mph. A similar train was demonstrated at the Crystal Palace, London during 1881, thus becoming the first electric railway in England, and continuing to operate there for over two years. Siemens' locomotive is now preserved in the Munich Technical Museum.



A lavishly decorated first class car of the Giants Causeway Tramway, built in 1883 by Midland Railway Carriage & Wagon Co, Shrewsbury. (N. G. R. S. Library)



*Bagnall/Westinghouse Bo-Bo No 2 of the Thamshavn Railway, Norway,
on a passenger train, probably at Thamshavn, about 1908,
(Huddersfield Railway Circle Library)*

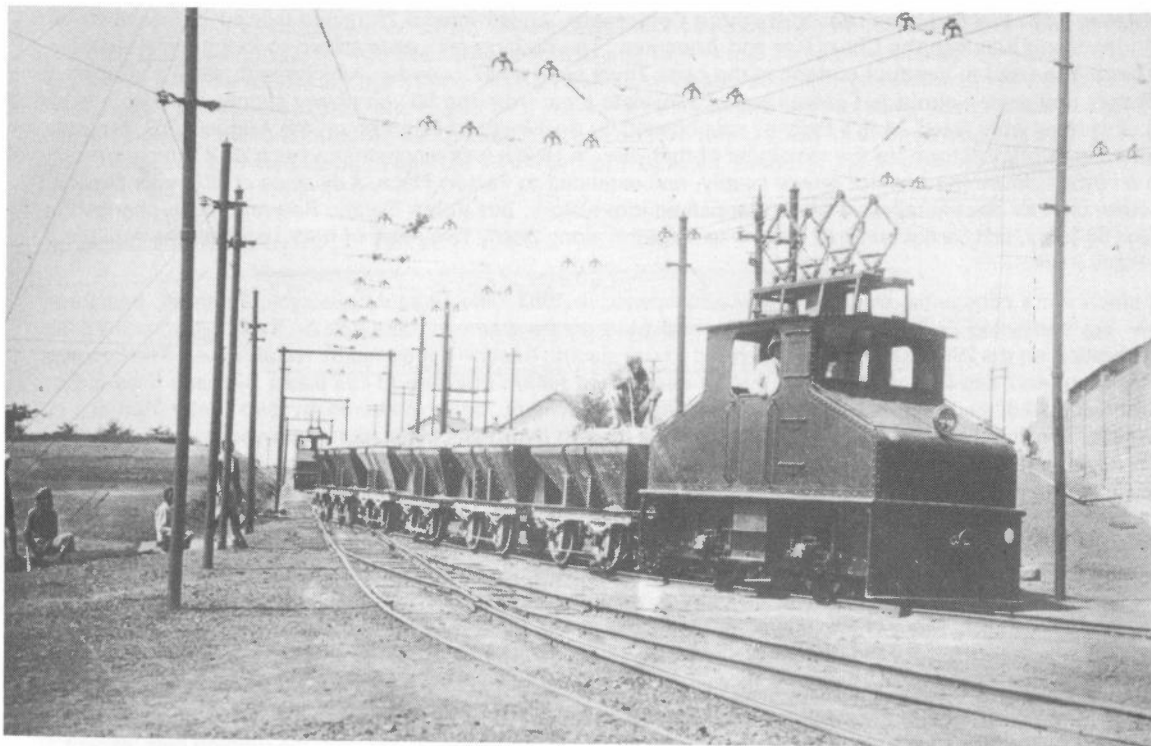
Magnus Volk, Electrical Engineer to Brighton Corporation, constructed a 2ft gauge railway $\frac{1}{4}$ mile in length along the shore between the Chain Pier and Aquarium. The running rails were spiked to longitudinal sleepers, and were also used to conduct current to the cars. There were small, wooden vehicles with small platforms at each end, and seated about ten passengers. To insulate them from the 50 volt power supply, wooden wheels with steel tyres were fitted. Volk's Railway was opened by the Mayor of Brighton on 4th August 1883, but only operated in its original form for the remainder of that year. In 1884 it was reconstructed as a 2ft $8\frac{1}{2}$ in gauge line, with an offset centre third rail for power supply, and extended to Paston Place, a distance of $\frac{5}{8}$ mile. Most of the other pioneer electric railways have disappeared into history, but Volk's Electric Railway, much changed in the last 96 years, still carries summer visitors to Brighton along nearly two miles of track between the Aquarium and Black Rock.

A much more substantial electric railway also opened in 1883. The Giant's Causeway, Portrush, and Bush Valley Tramway and Railway had been planned as a steam tramway, but W A Trill, who secured its incorporation on the 29th August 1880, intended to use electric traction generated by water power. The line was 7 miles long, and was laid to 3ft gauge, with a raised third rail on one side of the track. Siemens Bros & Co, Stafford supplied the electrical equipment, the 250 volt dynamo being powered by two water turbines at Bushmills. The line therefore became the first to have its own hydro-electric station, a power source which was to be widely adopted in the coming years. Unfortunately, the equipment proved troublesome at first, but because the third rail would have been too dangerous in a town, steam tramway locomotives were obtained to work the last half mile of track to Portrush station. These worked the entire line from 29th January 1883 until 5th November 1883, when electric services began. In 1899 overhead conductors were installed to replace the third rail, and steam working ceased, except for short periods of heavy holiday traffic. The tramway survived until 30th September 1949, when it became a victim of the increased costs which spelt the end to so many Irish railways after the war. Most of the equipment went for scrap, but the body of one of the covered toast-rack trailer cars was purchased for the Belfast Transport Museum, and is now displayed there.

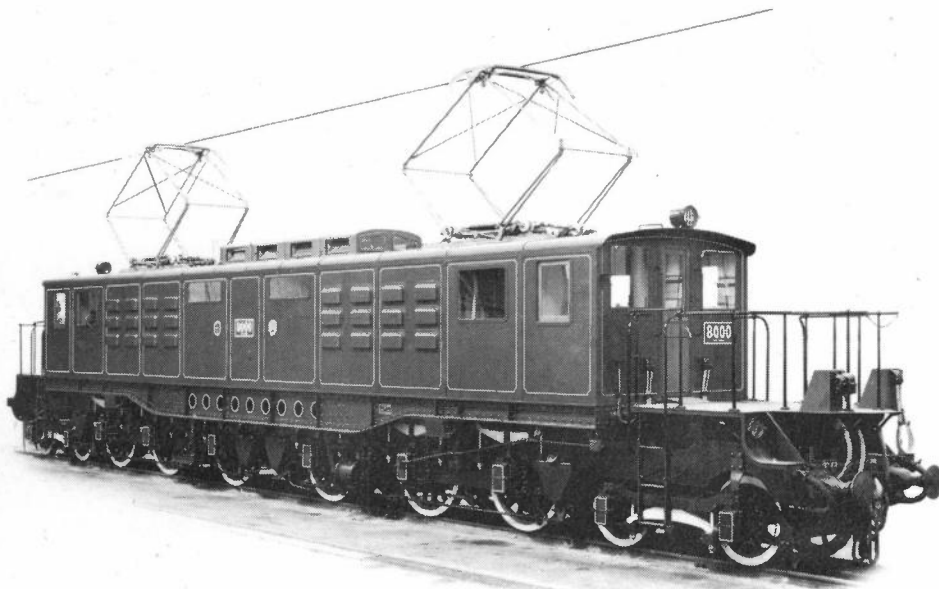
The Bessbrook & Newry Tramway, also in Ireland, was incorporated in 1884 by the Bessbrook Spinning Company, primarily to carry passengers and freight between its flax mill, and the town of Newry 3 miles away. This line was also 3ft gauge, with a centre conductor rail positioned a little lower than the running rails, except at an intermediate road crossing where overhead wire was installed. Hydro-electricity was again used on this line, and was generated in a power house at Millvale on the Camlough river. A water turbine drove two Edison-

Hopkinson dynamos, which supplied 245 volts to the third rail. The electric motor cars had a separate motor compartment above the leading bogie, and the Hopkinson motor drove onto the rear axle, which was coupled to the leading axle by side rods. An unusual feature of the tramway was a number of wagons and vans, with flangeless wheels which ran on additional rails positioned outside, and a little lower than the running rails. These could be loaded at the mill, towed behind a motor car to Newry, then run up a ramp onto the road, and be hauled by horse either into the town or down to the docks. This tramway also survived the war, but closed down on the 10th January 1948. Motor car No 2, built by Mather & Platt and Ashburys in Manchester in 1885, was by then the oldest electric vehicle working in the British Isles, and was obtained by Mather & Platt Ltd for preservation at the Belfast Transport Museum.

Over the next few years electric railways and tramways spread rapidly, and technical developments continued apace to bring this form of transport out of the pioneering phase to become an established part of the modern scene. The most significant single development was the introduction of alternating current electrification, which, in the first experiments in Europe, used the three phase system. British companies played a big part in many new developments, and in 1908 the British Westinghouse Electrical & Mfg Co, Manchester installed an a.c. system on the metre gauge Thamshavnbanen in Norway. This was a freight line running for 17 miles from sulphur mines at Lokken, to Thamshavn on Orkedali Fjord. Power was generated in a hydro-electric station, which supplied 15000 volts at 50 cycles per second, three phase, which was then transformed to 6600 volts, 25 cycles, and a single phase applied to the overhead. Three locomotives were supplied by W G Bagnall Ltd, and a railcar by the United Electric Co of Preston. The locomotives were in service until the Second War, when they were sabotaged, but later two were rebuilt and continued at work until 1963. One is now preserved at Oslo. W G Bagnall built the mechanical parts for a number of other early electric locomotives, including a pair of interesting d.c. machines for the metre gauge Mysore Goldfields railway. These had electrical equipment by Siemens of Stafford, and used an unusual twin overhead supply and return system instead of the more conventional single wire supply, with return through the running rails.



*Mysore Goldfields, India. A Bagnall/Siemens locomotive built at Stafford in 1910
(collection Brian Webb)*



Imperial Government Railways of Japan. The express electric locomotive built by The English Electric Co and North British Locomotive Co in 1923. (collection Brian Webb)

During the 1920's extensive railway electrification programmes were undertaken in many parts of the world, and the majority used 1500v direct current. Those of particular interest to us are the 3ft 6in gauge lines in Japan and New Zealand. Metropolitan—Vickers Electrical Co Ltd, Trafford Park, the successor to British Westinghouse, supplied one locomotive to the Japanese Imperial Government Railways in 1922, and The English Electric Co. Ltd., followed up with 31 Bo-Bo's of 1200/1224 hp over the next three years. In 1925 they delivered eight enormous 2Co-Co2 express passenger engines, easily equal to anything operated on the standard gauge at that time. Many of the smaller private railways in Japan were also implementing electrification during the same period, and they too received a number of freight locomotives, mostly Bo-Bo types, and over 500 sets of electrical equipment for multiple unit trains—again from English Electric.

The first section of the New Zealand Government Railways to be electrified was the Arthurs Pass section of the Christchurch—Greymouth line, which included the 5½ mile Otira Tunnel. English Electric installed the complete system, and delivered five conventional locomotives, and one battery powered Bo-Bo with a large battery tender. These have only recently been replaced by new machines. The route from Christchurch to Lyttelton also includes a long tunnel, and English Electric carried out this electrification in 1928. The six Bo-Bo locomotives had four 300 hp traction motors, and weighed 50 tons, relatively low for the period. In the 1930's the Wellington—Paekakariki line in North Island, which also included a tunnel, was equipped by English Electric. Hawthorn Leslie supplied the mechanical parts for the first locomotive in 1937, an unusual 1-Do-2 type developing 1240 hp. Electrical equipment was also delivered to the NZGR shops, where a further seven examples were built for this line, and two for the Arthurs Pass line.

A less conspicuous development nearer home was the Post Office Railway in London. This 2ft gauge line is remote controlled, and is the only railway of its kind in the world, being solely used for transporting containers of mail between sorting and despatch centres in London. The entire electrification project was undertaken by English Electric, including the complex control system required to operate the 140 driverless mail wagons. The railway was opened on 5th December 1927, and recently celebrated 50 years of continuous operation. A contract to re-equip the line has recently been awarded to Greenwood & Batley Ltd, of Leeds, and it therefore seems probable that this unique narrow gauge railway will be operating for another fifty years at least.

Another programme initiated in the 1920's was on the Natal main line of South African Railways. A 3000 volt d c system was installed on a 73 mile section by Metro-Vic in 1925, to allow more traffic over the steeply graded



*One of the versatile class 3E locomotives of South African Railways with a typical passenger train of nearly thirty years ago.
(collection Brian Webb)*

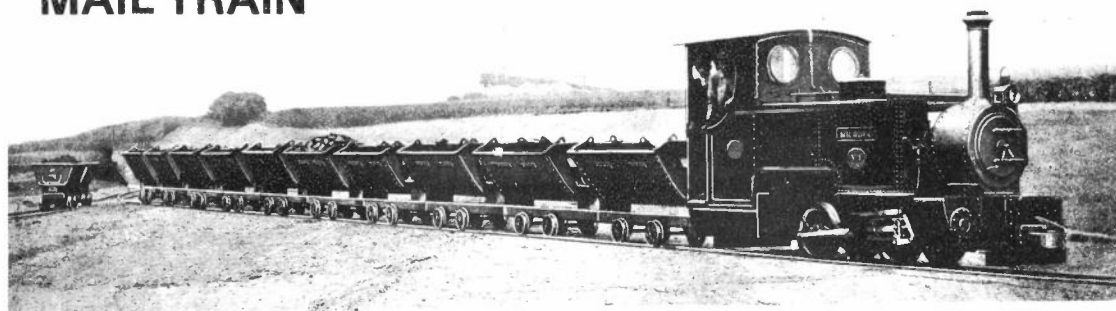
route from Durban to the Witwatersrand. A progressive policy of extending electrified lines has now given SAR an extensive network of suburban routes in the Johannesburg and Cape Town areas, and long sections of the main line. It also has the world's largest fleet of narrow gauge electric locomotives—over 1700 in total—virtually all supplied by British manufacturers, and, apart from accident casualties, all still in service. The earliest were Bo-Bo types of 1200 hp, but in 1947 Metro-Vic delivered the first of the class 3E, a 2490 hp Co-Co. The class 5E, a 2000 hp design produced by English Electric in 1955, reverted to the Bo-Bo type, and formed the basis for future development of the 5E1, and 3200 hp class 6E and 6E1. These are still in production at the Union Carriage & Wagon Co Ltd, Nigel, Transvaal, using electrical equipment largely made in Britain by GEC Traction Ltd.

The early application of alternating current to electric traction has already been mentioned, and several different systems came into use in Europe and elsewhere. However, there was obviously a great advantage in using standard industrial frequency (50 Hz), but it was only recently that this became widely adopted. It is significant that the latest development is not only on 3ft 6in gauge, but also designed in this country.

The South African Iron & Steel Industrial Corporation (ISCOR) constructed a new railway from Sishen, in northern Cape Province, to Saldanha Bay, north west of Cape Town, to transport high grade iron ore from a new mine to the port for shipment. The route is 864 km (540 miles) long and runs through semi-desert country. To move 17 million tons of ore a year through this difficult country a 50 kV supply was chosen because it required a minimum number of substations, and this line has therefore become the world's first 50 kV 50 Hz electric railway. Three trains will be run each day, made up of 202 bogie wagons with a gross weight of 20200 tonnes, and hauled by three locomotives working in multiple. GEC Traction Ltd carried out the design of the 3786 kw (5067 hp) machine in 1976, they were built by Union Carriage & Wagon Ltd, and completed last year. The 25 examples are now designated SAR class 9E, weigh 168 tonnes, and are the heaviest and most powerful narrow gauge electric locomotives in the world. Although they are capable of speeds of 90 kph the normal running speed will be much lower, giving a journey time of about 18 hours. Loaded trains will normally run through passing loops, with a stop half-way to change crews.

Now, after one hundred years, narrow gauge electric traction has grown from an interesting technical toy to a system capable of moving tonnages rarely encountered on the standard gauge. One wonders what changes the future will bring.

MAIL TRAIN



THE STIRLING SINGLES

I was extremely interested in Colin Pealling's letter in NG81, and apologise for using his photograph without permission. My copy negative was taken from the collection compiled by W A Smyth at W G Bagnall Ltd. Colin's comments on dates are interesting, but the photograph on page 4, given to me by Mr R G Pratt was dated by him as 1938, and led me to date the view showing Colin as about 1939. I have subsequently located additional pictures of the locomotive at Jaywick, all undated, showing either the front brake pipe, two front buffers and the name CENTURY; or no front brake pipe, no reservoirs, no name and only one front buffer. The air pump mounted on the cab side appears on a picture of its second form, but there is no comparable view of the right hand side in its first form! The translation of the air hose into a vacuum hose must rest with the editor and not me. (*The editor and proof reader apologise. Ed.*)

Ken Plant comments on the possible building date, but all three order books of the period clearly give the order date as 2nd June 1893. Delivery dates are not listed in this source, but the card index compiled by W A Smyth, and the notes which H E S Lorton, a former employee, put together in the 1920's give the delivery date as 4th September 1893. Drawings of the locomotive and rolling stock seem to confirm this. I have never seen anything to indicate that it was built for stock and there is little doubt in my mind that it was delivered from Stafford in September 1893. Nevertheless it is just possible that Faulkners did not have a customer for it at that time as they are the only name I have seen in any Bagnall records.

NEWCASTLE, STAFFS.

ALLAN C BAKER

A JAMAICAN DISCOVERY

I was interested in the feature in NG 81, and can add some recollections from a voyage on the ship SUGAR REFINER in 1963. Unfortunately I was not greatly interested in railways at the time so the details are incomplete.

We berthed at Bowden, also known as Port Morant, a small port of the south-east coast of Jamaica. The single berth was owned by United Fruit (Jamaica), and was used for loading bananas by hand, and bulk sugar brought from storage silos over a narrow gauge railway. This railway, of about 2ft gauge, ran in an oval around the banana storage shed, and had spurs to the sugar silos and an open-sided locomotive and wagon shed. At one time it had extended inland to serve the local estates, but this section had been lifted and sugar was brought in by road transport. Wagons were loaded at the silos, weighed and run down to the wharf where the bodies were lifted off the frames by the ship's derricks, swung over the hatches and tipped into the hold. Two trains were in operation on the "Merry-go-round" system.

The rise from the wharf to the silo reversing spur was steep and sharply curved. The drivers would build up speed along the wharf to enable the train to breast the rise, but occasionally the locomotive would leap off the track on the sharp curve at the end of the wharf and operations would cease while a group of stevedores man-handled it back onto the rails. I recall that the two locomotives were small, grimy green diesels fitted with cabs, possibly of Ruston or Hunslet make, and trailed a plume of black smoke as they struggled with the heavy trains.

The same ship also used to load from barges at Goodrich Bay, between Port of Spain and San Fernando in Trinidad. Narrow gauge railways had certainly been used in the local estates at one time, and I once photographed an oil-fired locomotive boiler complete with saddle tank, possibly of Hunslet or Peckett manufacture, which was mounted on a road trailer presumably for soil sterilisation. This might have originated on a local estate or the 3ft gauge Trinidad Government Railway. Perhaps these recollections may inspire wandering members to investigate the West Indies to see whether these remnants still exist.

BIRCHINGTON, KENT

MIKE K JACKSON

POSTSCRIPT TO SAND HUTTON

After the publication of my article in *The Narrow Gauge* No.81 I received a letter from B Derek Stoyel querying the works number of ESME, stating that he visited the R E Depot at Deptford on 22nd January 1938, and found seven 18in gauge Hunslet 0-4-OWT's carrying Deptford numbers 1, 3, 5, 6, 7, 8 and 9. All were in beautiful condition, but had obviously been out of use for some time.

The article by H G W Household in *Locomotive Magazine*, 15th October 1928 gave Hunslet Engine Co numbers 1207/1916, and 1289-91/1917 for the S.H.L.R. quartet, but stated that they became ESME, 2, 3 and 4. So far as I was aware, these numbers did not appear on the engines, and I stated this point in *The Sand Hutton Light Railway*. These numbers were also given by the Hunslet Engine Co in a letter to Eric Cope many years ago.

B Derek Stoyel, however, has several broadside views of HE 1289 and 1291, taken in 1927, showing the Deptford running numbers, HE works numbers, and dates quite distinctly. Unfortunately I had no knowledge of these when I wrote the book, neither did I obtain previously unknown photographs of ESME and No 12 until some years after publication. I have, therefore, been checking all my photographs and information in the light of these new facts.

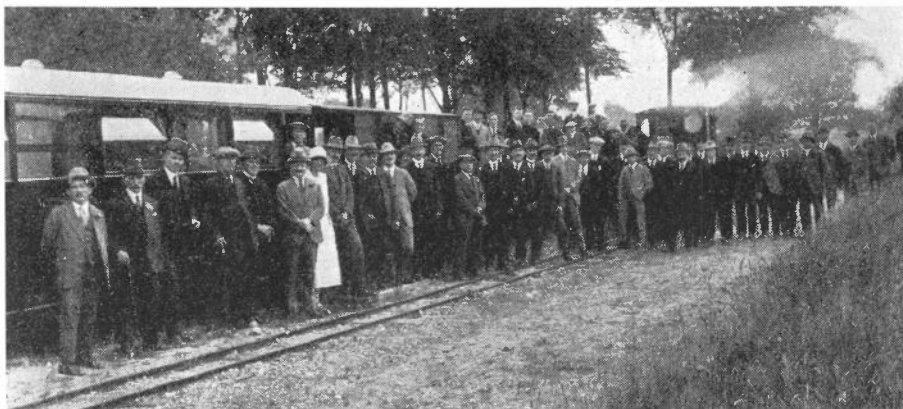
There is now no doubt that ESME was not HE 1207, but HE 1289/1917, (Deptford No 10); S.H.L.R. "No 11", was evidently HE 1290/1917, formerly Deptford No 11; and S.H.L.R. no 12 was definitely HE 1291/1917, formerly Deptford No 12. I stated in the book that I had never seen any photograph of HE 1207, (Deptford No 4). Well, I now have a rather poor picture by C F Klapper showing a locomotive on the ramp at Warthill. The number is not very clear, but looks like No 4. So it seems that we have pictures of all four S.H.L.R. Hunslets, and have at last settled the mystery!

SELBY, N. YORKS

KEN HARTLEY

I have read this article with absorbing interest, and it has led me to add a few notes on the subject for the record. The photograph on page 6 was published in a London newspaper (almost certainly the *Daily Mirror*), prior to the marriage of Sir Robert Walker, with the caption:

"Sir Robert Walker, Coldstream Guards, whose engagement to Synolda, daughter of Mr and Mrs Thursby-Pelham, is announced. Sir Robert, who is said to be one of the richest men in the British Army, is seen above on his miniature railway. Portrait, the bride elect". (The portrait of the lady is shown as an inset.



The accompanying photograph, by H Speed of York, was published in *Railway Magazine* October, 1924. It depicts members of the York station staff at Bossall station on Sunday, August 10th, 1924, and the caption reads:

"Fifth from the left is Mr Wheddon, Stationmaster at York, and next to him will be noted Sir Robert Walker and Lady Walker, together with Mr Pattinson, Chief Clerk to the York Stationmaster".

My own researches prompted me to turn to Henry Greenly's magazine *Models, Railways and Locomotives*, Vol 4, p.362 (1912), where the following announcement appeared:

"The first of the Narrow Gauge Railways' Ltd new Atlantic-type locomotives was finished this month (December). The engine was been designed by H Greenly for heavy traffic, and is over 30% more powerful than the previous engine built for the Miniature Railway Company of Great Britain. It has cylinders 4in by 7in with valves on top, 11,000 sq in of heating surface, and 20in driving wheels. The total weight with the new 55 gallon tender is 2.6 tons in working order. The first engine, not being required immediately for the

company's work, has been purchased by Sir Robert Walker, of Sand Hutton, Yorks. It was built by Messrs Bassett-Lowke Ltd, at Northampton. The firebox is of the wide type with a basket grate, and the trailing wheels have outside radial axleboxes".

In *The Oil Can*, December 1913 (the house magazine of Bassett-Lowke Ltd) is an article describing the Sand Hutton Railway. A gradient diagram is also included, the heaviest being 1 in 60. In the matter of rolling stock, Bassett-Lowke supplied four open cars. The article goes on to state:

"...two of the cars are fitted with vacuum brakes. Sir Robert Walker has also constructed two coaches, one a smart passenger coach seating ten passengers, covered in and well provided with observation windows, and the other a brake van with sliding doors and end windows. The former is mounted on four-wheeled bogies, and the latter on four wheels. These two cars weigh ½ ton apiece, while the open cars weigh 780 lb each. The actual seating accommodation of the train is thus 48 passengers, (including tender and brake van), but on one record occasion no less than 75 crowded onto the train, and were hauled with ease!"

On a visit to Sand Hutton both Greenly and Bassett-Lowke were permitted to carry out tests on their locomotive with a load of 44 passengers and 2½ tons of ballast in wagons, from Village station to Fishponds, a distance of ¾ mile. A maximum speed of 18.6 mph was obtained, the time taken for the journey being 3¼ minutes.

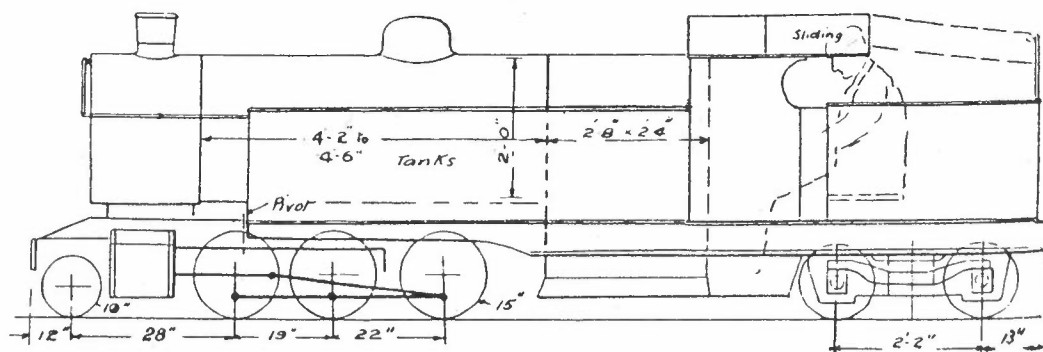
Greenly's proposed 2-8-4, which he designed for Jubb in 1919, was not his first venture into articulated locomotives. His first approach goes back to 1912 when he adopted what he described as his "Garratt" type tank engine with a water tender in front. This was followed by a 0-6-4 tank of similar design with articulated coupled wheels, but it was not until 1916 that drawings were published. Rodney Weaver has pointed out that the bogie pivot would be on the axis of the chimney, so that the blastpipe went straight up through the centre of the pivot. The 200ft radius curve shown on the drawing in NG 81 intersects the baseline beneath the chimney and rear bogie to confirm this point. The boiler, cab, and tanks are mounted on outer girder frames as shown in the cross section. This allows a wide firebox, a scheme adopted by Greenly for his freelance 4-6-4 tank HALTON in 1930. The estimated tractive effort of the proposed 2-8-4 was 1100 lb, compared with 1600 lb for the proposed "Garratt".

TEIGNMOUTH, DEVON

ERNEST A. STEEL

(I contacted H Speed of York whilst preparing my book, but discovered that he had destroyed his many photographs taken for Sir Robert long ago. Note that this picture shows the coach roof over the vestibule straight, as on Hudson's drawing. I guess that someone must have hurt his head on this, which caused it to be modified to its later, unique form. The quote from "The Oil Can" is very welcome, giving additional information on the 15in gauge coaches, and confirming that the van had four wheels, as I stated in the book. I have an R. & E.R. official booklet which states, quite wrongly, that this van was an eight-wheeler.

—KEH)



At Ken Hartley's suggestion I enclose an illustration from *Models, Railways and Locomotives*, July 1915 which was undoubtedly prepared by the editor, Henry Greenly. The similarity between the proposed 15in gauge articulated 2-6-4 tank, and the 2-8-4 tank illustrated in *The Narrow Gauge* No 81 is immediately apparent. Surprisingly, the pivot is shown behind the leading coupled axle, on the 2-6-4, whereas there is no indication of its position on the 2-8-4.

SUTTON, SURREY

D.J.W. BROUGH

(The original drawing showed only the front portion of the locomotive, and has been modified to show the cab and trailing truck. Ed.)

Passenger Cars

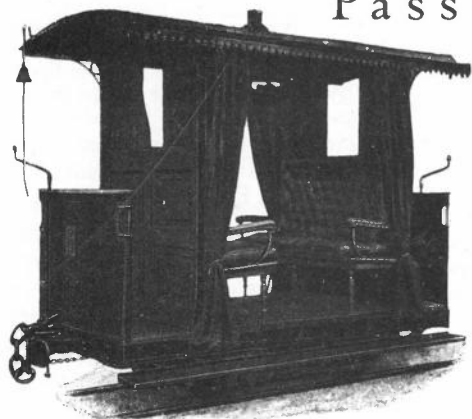


Fig. 13868

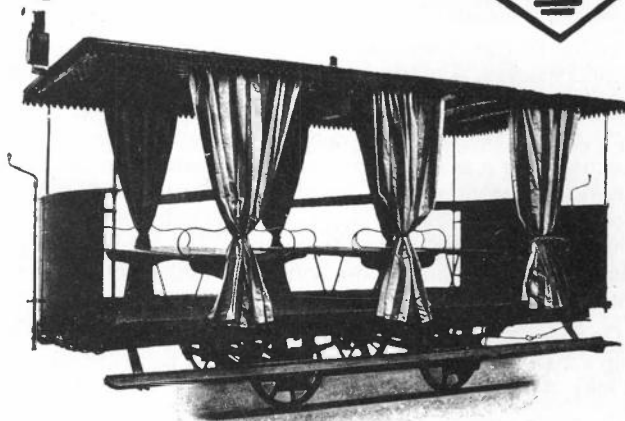


Fig. 13865

Fig. 13868

Four Wheeled Semi-Enclosed Passenger Car, with upholstered seats for 4 to 6 passengers, fitted with chain brake at each end, suitable for animal or locomotive traction, for 2 ft. to metre gauge.

Fig. 13865

Four Wheeled open Passenger Car for 18 to 30 passengers, fitted with chain brake, suitable for animal or locomotive traction, for 2 ft. to standard gauge.

Fig. 13815

Saloon Passenger Car on bogies, external wood work of teak, suitable for tropical countries, built to seat 16 to 24 passengers, with standing room for 10 passengers, with screw brake at each end, spring centre buffers, for locomotive traction. Gauge 2 ft. to metre.

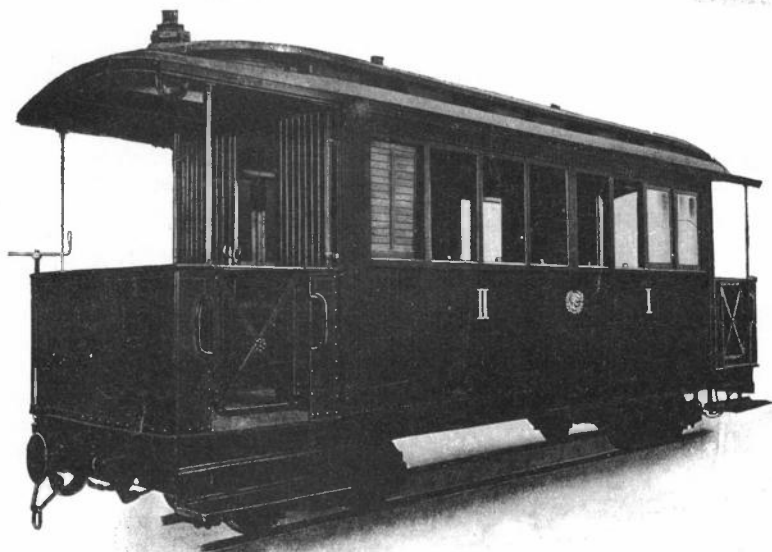
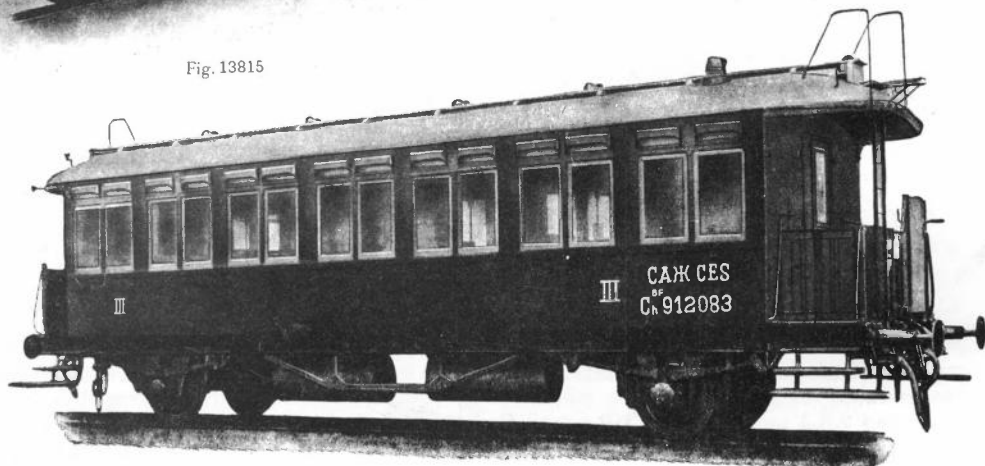


Fig. 13815

Fig. 17146
Four Wheeled Third Class Corridor Car to seat 63 passengers, fitted with eight-block screw brake with air brake combined, a lavatory with flushing water at one end. Standard gauge.



This page from Orenstein & Koppel A.G. catalogue 882, probably published in the 1920's, depicts a couple of interesting horse tramway cars, and a passenger carriage for one of the German colonial railways in Africa. (collection M. Swift)