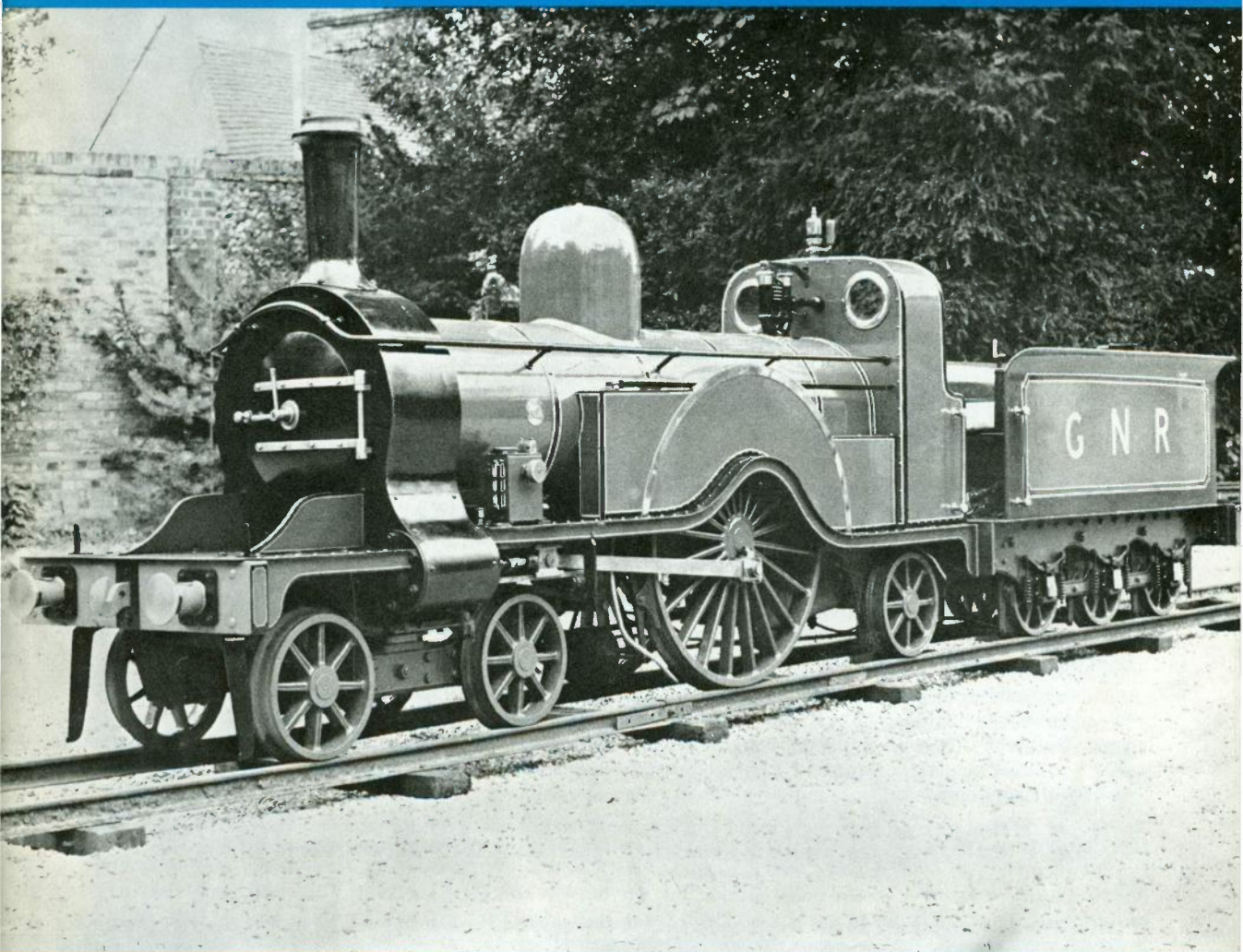


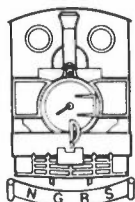
THE NARROW GAUGE

No.76

Summer 1977



NARROW GAUGE RAILWAY SOCIETY



NARROW GAUGE RAILWAY SOCIETY

Serving the narrow gauge world since 1951

SECRETARY : M. Swift, 47 Birchington Avenue, Birchencliffe, Huddersfield, HD3 3RD.
MEMBERSHIP SECRETARY : R. Pearman, 34 Giffard Drive, Cove, Farnborough, Hants.
TREASURER : T.G. Welsh, 9 Derwent Crescent, Kettering, Northants.

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, Preston and Stoke-on-Trent. Annual subscription £3.50 due 1st April.

THE NARROW GAUGE

EDITOR : A. Neale, 7 Vinery Road, Leeds, LS4 2LB
ASST. EDITOR & LAYOUT : R.N. Redman, 14A Oliver Hill, Horsforth, Leeds, LS18 4JF
BACK NUMBER SALES : G. Holt, 22 Exton Road, Leicester, LE5 4AF.

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 Ltd., 43 Pikes Lane, Glossop, Derbys. SK13 8ED.

EDITORIAL

Our Society necessarily covers a wide range of interests, and obviously The Narrow Gauge should reflect this variety. On the whole we probably succeed in achieving this aim, but with increasing interest in modelling amongst our membership this is possibly one aspect of the narrow gauge field which should receive more attention. Many magazine illustrations show suitable prototypes for models, and, subject to availability, we plan to include at least one drawing in each issue, which is also of direct benefit to modellers. However, it is some time since we carried any specific modelling articles, and would be pleased to consider suitable material. Descriptions of layouts and modelling techniques are possibly best left to the specialist model railway press, but brief articles—say one page with a photograph—on a particular project would be very useful.

Whilst on the subject of magazine content it is pleasant to see the number of articles that are being received. We have several manuscripts in stock on specific locomotive types and overseas lines (although more are always welcome!), but articles on British industrial lines are still scarce. If you want to describe a particular line but feel that you have insufficient detailed knowledge, please get in touch because we can often give guidance or specific information.

Finally, a plea to members with good quality black and white photographs to advise of their subjects. Publication of articles is sometimes delayed for want of good illustrations, and this information is therefore vital.

Cover Photo: The Regent Street Polytechnic locomotive as rebuilt under the auspices of R.G. Pratt, seen here when owned by Mr. Braithwaite on 4th September, 1976
(Allan C. Baker)

THE STIRLING SINGLES

Alan C. Baker

A history of the 18" gauge 3" scale models built in the last century by W.G. Bagnall Ltd. and the Regent Street Polytechnic.

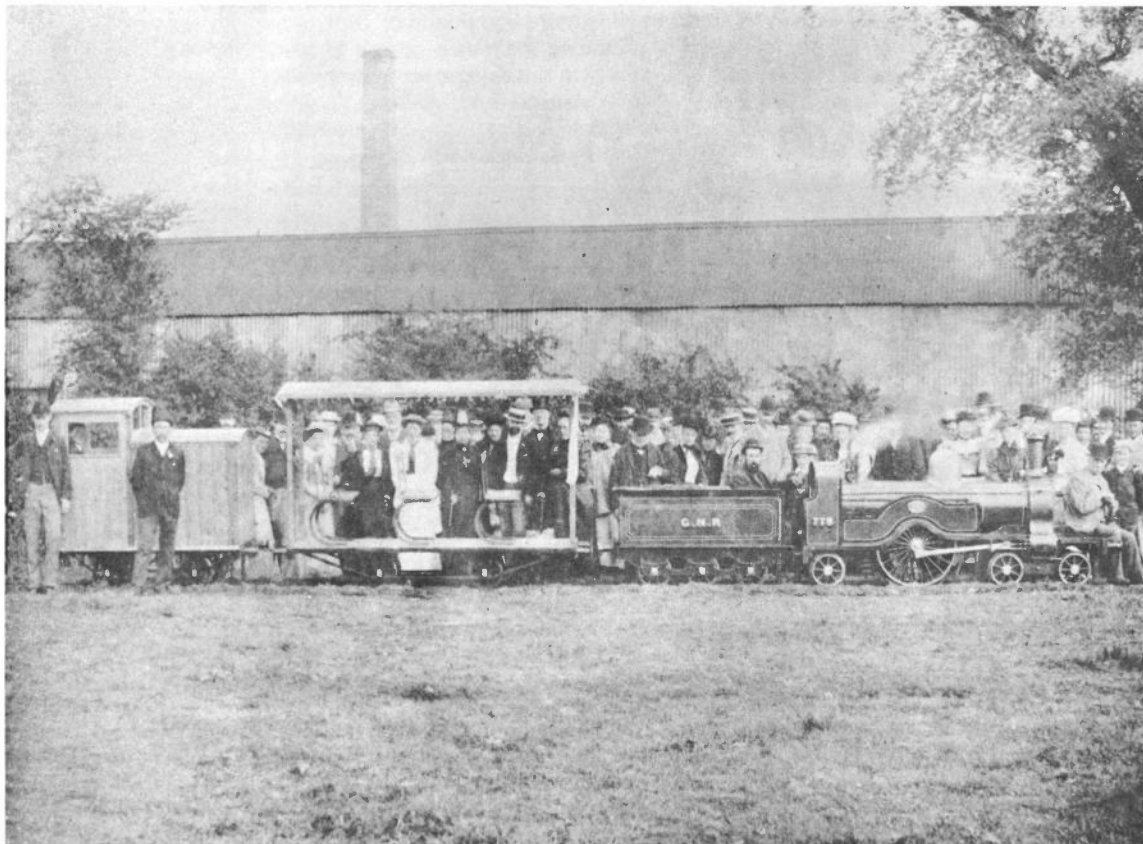


The Bagnall built Stirling single (WB 1425/93) outside Bagnall's works before delivery (Collection R.N. Redman)

Two 18" gauge 3" scale miniature locomotives based on Patrick Stirling's famous 8ft singles of the Great Northern Railway exist, both are of considerable age and ancestry and much confusion and uncertainty has surrounded them over the years. Even today people repeatedly manage to get the two mixed up with each other and the notes in a recent issue of this magazine have prompted me to assemble this short article in the hope that once and for all the record will be set straight. Having said that I must point out that there is still some doubt, as readers will see for themselves, surrounding some of their movements, however there should now be no doubt about which locomotive worked where.

On the 2nd June 1893 Messrs Faulkner Bedford & Co, of 95, Shaftesbury Avenue, London, commissioned W.G. Bagnall Ltd, of the Castle Engine Works, Stafford, to build an 18" gauge replica of a Stirling GNR 8ft. single. As well as the locomotive, they ordered two items of rolling stock and a quantity of track. (It must be remembered that at this time Bagnalls made a speciality of the complete equipping of light and narrow gauge railways: they were never just locomotive builders but railway engineers in the true sense.) The rolling stock comprised of two four wheeled vehicles, an open toastrack coach (actually completed with an awning) and a covered brake van, built respectively under general order numbers 244 and 249. The whole was for the use of Lord Downshire for a projected railway around his estate at Easthampstead Park, near Crowthorne, in Berkshire. The locomotive, the main dimensions of which are given in Appendix One, was finished in GNR colours and lining with their initials on the tender sides and the number 778 on the cab sides. A small brass plate on each splasher read:— W.G. Bagnall Ltd., Stafford 1893. The actual GNR No 778 was built at Doncaster, Works No 435, in 1887 and was the last of the first series, later ones were slightly larger in some dimensions. Carrying Bagnalls works number 1425, the model was delivered on 4th September 1893 at a cost of £360.

Only a few years before this locomotive was constructed Bagnalls had been joined by a man who was to revolutionize much of their organisation and methods, one Ernest E. Baguley, a man of great genius and inventive powers. He came from Hawthorn Leslie of Newcastle, and became Bagnall's Chief Draughtsman. They owe a lot to his drive and ability and knowing of his later work after leaving Stafford one can imagine that he was instrumental in much of the design work associated with this engine. It must however, in fairness, be mentioned that in several features No 778 was not an exact copy of its prototype, there were deficiencies but the parentage would never have been in doubt. For instance the small size of the carrying wheels was very noticeable and the uncased Ramsbottom safety valves, whereas a handsome brass cover graced the GNR engines. The use of a domed boiler precipitated the action of Stirlings successor, Ivatt, who commenced conversion of the class in June 1896. No. 93 was the first engine so fitted but only six subsequent engines were so treated, No 778 not being one of them.



E No 1425, train, corporation and onlookers behind the Cusle Eng. Wks. at Stafford. S.T. Price Works Manager driving W.G. Bagnall (right) & E.E. Baguley (left) dogside brake van. Collection A.C. Baker

So much interest was attracted by this locomotive that after completion the Mayor and Corporation of Stafford, of which Bagnall himself was a member, were invited along to the works to inspect both engine and train. A length of track was laid behind the works and with S.T. Price, works manager, at the regulator, Bagnall and Baguley as joint guards, a jolly good time was had by all, the whole cortege being much photographed and even appearing in the *Strand Magazine*. Bagnalls were very proud of the whole achievement and engravings and photographs were used in publicity material for many years.

It would seem that the railway at Easthampstead did not remain long for the locomotive at least, and possibly the remainder of the railway too, passed back into the hands of Faulkner Bedford & Co. She was re-sold by them to Mr J. F. Popham, an amateur yachtsman of some repute, who used her in the grounds of his home at Hamble in Hampshire, presumably with the same track and rolling stock. By this time the locomotive bore plates giving Faulkner Bedfords name on them and a Mr W. Spiller, who had charge of her at this period, acquired from Bagnalls a set of their plates and fixed them on the engine in their rightful place.

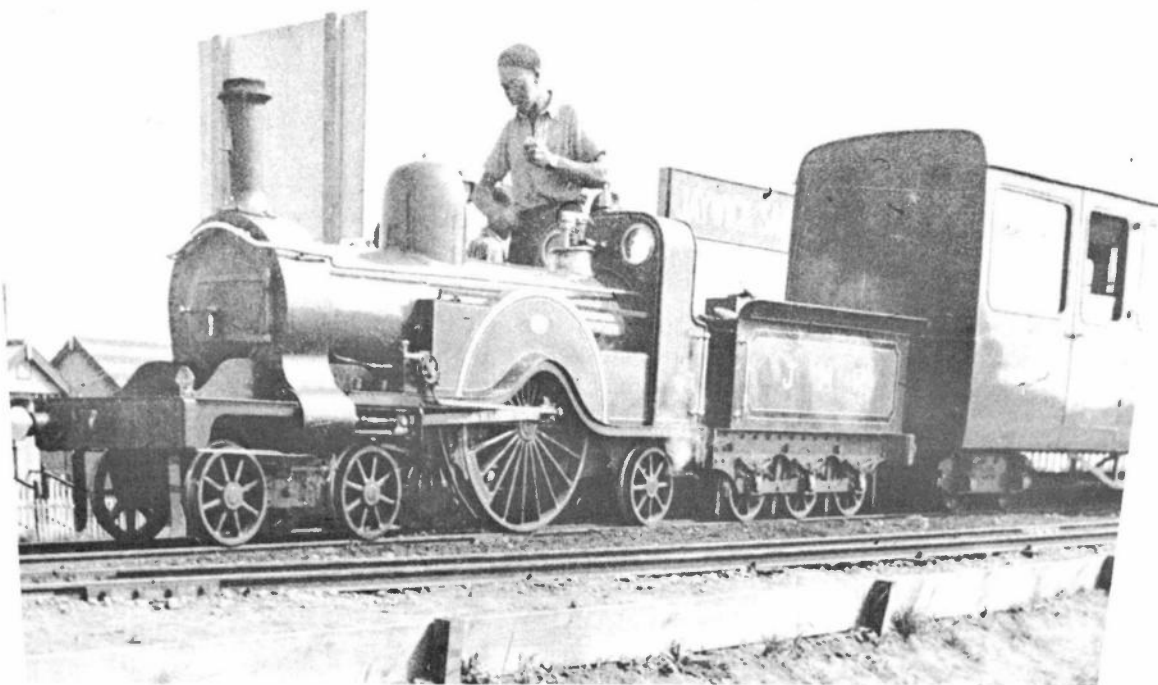
Once again the engine did not stay long for by 1899 she was, together one presumes with the track and rolling stock, in the ownership of Captain A. Hoare. R.N. This gentleman later ran a training ship for boys called "MERCURY". The vessel had been built at Devonport in 1878, being a cruiser engined by Maudslay of Lambeth, she was moored at the foot of the grounds of his estate on the banks of the River Hamble at Hamble itself. This was, of course, extremely close to the engine's former home and it is not outside the bounds of possibility that the two were contiguous. It is thought that after the death of the Captain in 1908 the railway passed into Admiralty ownership for the locomotive was later housed in the boys reading room of H.M.S. Mercury, by then a shore establishment. There is stated to have been one other engine about which little is known except for the fact that it was a 2-2-2 out of use around the time of the Captain's death. After the Second World War, which both locomotives surprisingly survived, they passed into the ownership of a Mr T.W. Smith, of Bitterne, near Southampton where the Single still remains in a very derelict condition to this day. It will be seen therefore that this engine spent much of its life in the Southampton area and its most unlikely that it has seen any use since before the First World War.

We must now turn our attention to the second engine. In about 1896 Professor Henry Spooner, principal of the Regent Street Polytechnic School of Engineering in London, decided that the construction of a model railway locomotive would make an ideal project for his students. Just why he chose a Stirling single as a prototype is as much a mystery as to why Lord Downshire had, perhaps he had seen or heard about the Bagnall engine. In any event the professor placed an order with Bagnalls, their general order number 120, for a complete set of drawings, a finished boiler, set of castings and forgings to enable him to make a replica of their No 1425, the order was placed in January 1897. The building of this engine by the Polytechnic was to occupy some considerable time and amongst those who were students and worked on the project was Henry Greenly, the famous model and miniature railway engineer who was later to gain immortality for his involvement in the Romney Hythe & Dymchurch and Ravensglass & Eskdale Railways. A fellow called Rogers, a former Swindon man, and Spooner were the principle actors in the construction and when they either left or acquired different interests construction lapsed and the locomotive spent much of its time stored in various stages of construction, latterly in the gymnasium. Around 1910-11 it passed into the ownership of Mr E.F.S. Notter, at that time District Locomotive Superintendent, Great Northern Railway, Kings Cross.

Notter lived at 206 Stock Orchard Crescent, off the Caledonian Road, and it was there that the locomotive migrated. Opinion varies as to the state of her when she came into Notter's possession, one thing is certain, he was far from happy with the external appearance and, being a model engineer of some distinction, he set about to rebuild the engine and eliminate some of its faults. He may indeed have actually completed the construction. It is well to remember that at this time the most famous of all G.N.R. locomotives, the 8ft single No 1 herself, was reposing in Kings Cross Top Shed and would, therefore, be in Notter's care. There is little doubt that he would take full advantage of this fact when working on his model and we know of tales of some of the larger parts being constructed in the machine shop there, the completed model then being numbered 1, with it has carried ever since.

It would seem that by the end of 1911 the model was complete, or altered to Notter's fancy and thereafter lived in Notter's front room at Stock Orchard Crescent, a short length of track was apparently laid and the locomotive steamed when its owner was so inclined. There is a tradition that in the period after he completed the model, and before the outbreak of the First World War, it operated on a short track by the lake in the grounds of Alexandra Park, Wood Green, North London, however I have been unable to either substantiate or refute this claim. Nevertheless, the story goes that he was always very frustrated with No 1 at his home as one revolution of the 2' 6" diameter driving wheel took the engine the complete length of his cramped garden! Because of this Notter was ever on the look out for a new home for his engine, but as he was obviously very attached to it, he was extremely particular about any potential new owner. Around 1923-4 the engine was displayed in the showroom of Witney Bros, City Road, London but it appears to have still been Notter's property on his death in September 1927.

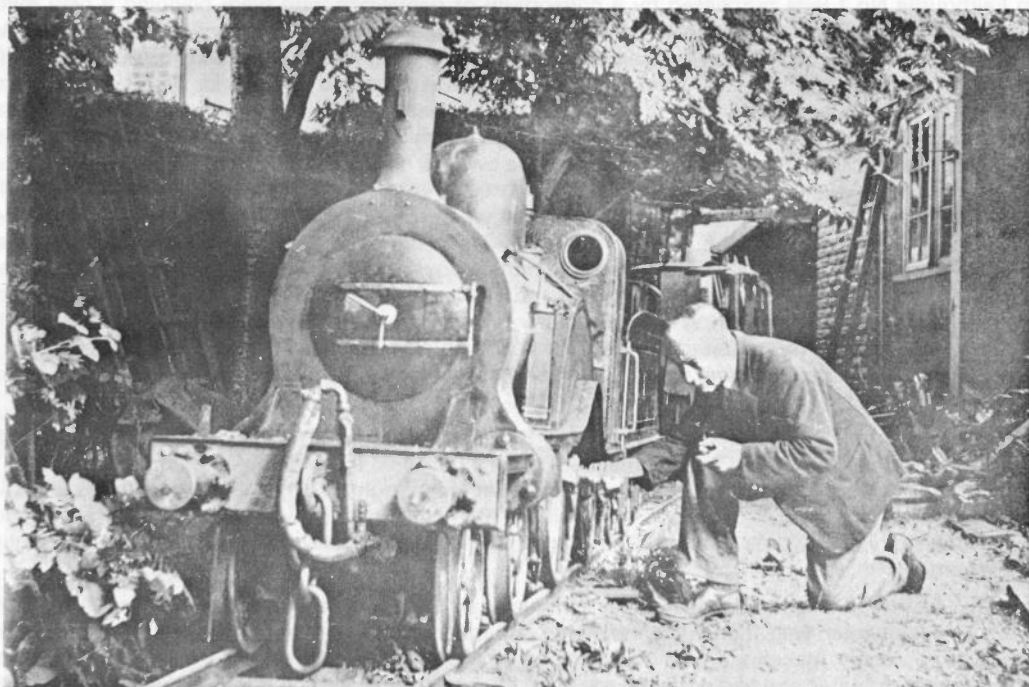
Subsequent to this event she passed to the ownership of the Fairbourne Miniature Railway in North Wales, despite the fact that this railway was laid to 15" gauge. Nothing daunted they proceeded to lay a third rail specially for her, however this never went the full length of the line. All in all No. 1 proved to be an expensive white elephant for the Fairbourne people as she was hardly suitable for the work required of her. Being a single driver she was intended, like her prototypes, for light fast trains, the opposite to those operated at Fairbourne. She was acquired at the time of an acute motive power shortage, and her new owners wasted no time in casting her to one side once additional power was available, so that although she remained there until late 1935 she saw very little or no use towards the end. Like all true miniatures, despite the fact that both No 1, and more particularly the Bagnall, were very well made, they were only intended to perform, in scale, similar tasks to their prototypes.



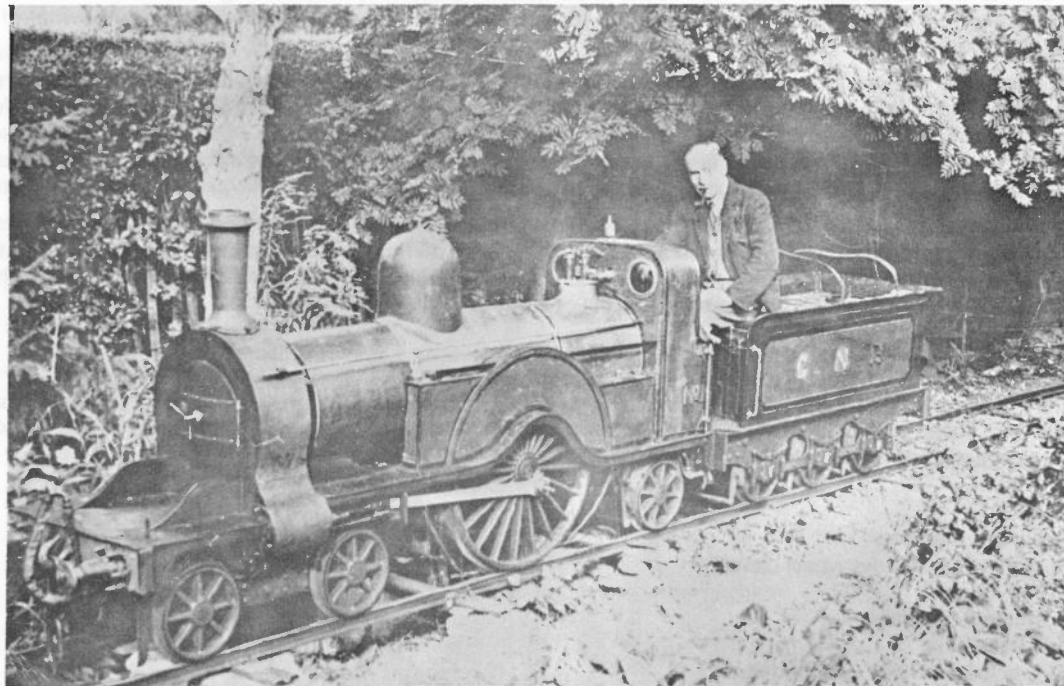
*The Polytechnic loco in use at Jaywick Sands in 1938. Note the missing left hand leading buffer, absence of front vacuum pipe and air reservoirs.
(R.G. Pratt)*



*A late (c1939) photo at Jaywick showing the Polytechnic loco with the name CENTURY, which was only carried for a short period. Note brake pipe on leading buffer beam, air reservoirs on tender and brake pump on cab side.
(Collection A. C. Baker)*



Two views of the Polytechnic loco in Mr. A.L. Bird's garden c1953. Note that loco still retains brake pipe on buffer beam and hoops on tender that formerly held the air reservoirs. The old coach behind the loco (upper photo) is probably ex Jaywick.
(Both photos collection A.C. Baker)



From Fairbourne No 1 was purchased by a consortium of gentlemen who were planning a new miniature railway as a Summer pleasure attraction on the Jaywick Sand estate, about 2 miles from Clacton in East Anglia. On reflection it seems strange that they should choose such an engine, which had already proved a dismal failure when used in similar circumstances. Nevertheless No 1 was taken to the works of Mr R.M. Morse, at Woodmancote, Sussex, apparently one of the owners who went under the name of Miniature Railways & Specialist Equipment Co., there she underwent a thorough overhaul. The Jaywick line was constructed to the designs of Commander C.C. Parsons, a further one of the owners, during the Winter of 1935-6, it was 1 mile long and ran from Jaywick Sands to the Tudor Village. Three coaches were constructed, bodies by Caffyns of Eastbourne and running gear by the owners, and the line was opened by Mr. C.H. Newton, Divisional General Manager, Southern Area of the L.N.E.R. on July 31st 1936. The normal load for the engine was three coaches, each weighing some 30 cwt, and No 1 was the sole motive power for the first three seasons. However similar problems were experienced to those at Fairbourne and as was to be expected much slipping took place. The coaches and tender were fitted with Westinghouse air brakes and these were subsequently extended to the engine, the compressor being mounted on the right hand cab side. Because of the difficulties and also some boiler trouble alternative motive power was acquired and this took over in 1939, the Stirling thereafter becoming a spare.

Soon after the outbreak of the Second World War the line closed, never to reopen, but it appears that both locomotives and stock were stored by Commander Parsons until sold to Mr Tommie Mann, a showman, some time around 1945-6. Mann operated an amusement park at New Brighton, Cheshire, but so far as is known he never actually used the Single. Later she was sold to Mr A.L. Bird who was workshop superintendent at Cambridge University, and moved to his home at Cambridge where he occasionally used her on a short length of track in his garden.

The further history of this locomotive is fully chronicled in the aforementioned Narrow Gauge No 69 by Mr R.G. Pratt. This gentleman was at one time the owner and to him must go much of the credit for the restoration work that was necessary, including a new boiler, to bring the locomotive to the standard it is in today, being in a terrible state when acquired she had not been steamed for many years. On the right hand splasher a brass plate with the following legend is now carried:— "Great Northern Ry Co, No 433 1887 Doncaster Works". Doncaster works number 433 was indeed a Stirling 8ft single built in 1887, running number 776 she was rebuilt by Ivatt with a domed boiler in 1898. Since the article mentioned above Mr Braithwaite has decided to sell the engine once more and its last public appearance was at the Expo Steam 76 event at Peterborough over the 1976 Summer Bank Holiday weekend being subsequently put up for auction at Sothby's. However the present owner of the engine is not known.

It is interesting to note that in 1906 Bagnalls designed two miniature locomotives based on G.N.R. practice, one was a 15" gauge 4-4-0 with distinct Stirling features having 4"x 6½" cylinders and 2'0" diameter driving wheels. The second one was an 18" gauge single based very much on Works No 1425 but with slightly larger cylinders, 4¼"x 7½". Unfortunately it is not known who these designs were for but as they both bear the same date it would appear, despite the gauge difference that they were to have been for the same potential customer.

In conclusion I would like to thank the many people who have over the years, helped me to assemble what is here collected together, it has indeed been a team effort. Special mention must be made of Messrs R.G. Pratt, G. Woodcock, R. Butterell, K. Leighton, P.C. Wilby, T.D.A. Civil, P.N. Townend and A.B.M. Braithwaite. I have also included as an Appendix a bibliography and list of sources.

APPENDIX ONE

Main dimensions of Bagnall No 1425. Over the years dimensions have been quoted in various sources for this and the Polytechnic loco. No-doubt some dimensions would change over the years during successive overhauls and repairs. Those quoted below are from Bagnalls records and would be true of No. 1425 as built, and the drawings supplied to the Polytechnic for their loco.

Cylinders	4" x 6½"
Driving wheel diameter	2'6" (20 spokes)
Bogie, trailing and tender wheel diameter	1'0" (8 spokes)
Bogie wheelbase	2' 1½"
Total engine wheelbase	7' 8¼"
Tender wheelbase	3' 0"
Total wheelbase engine and tender	13' 8¼"
Boiler barrel diameter	1' 3¼"
Boiler barrel length	4' 6¼"

Copper firebox and 26 (20 x 19/16" outside dia and 6 x 15/16" outside dia) brass tubes	
Heating surface, tubes	45.6 sq ft
firebox	7.3 sq ft
total	52.9 sq ft
Grate area	1.3 sq ft
Working pressure	150 psi
Water capacity of tender	66 gallons
Fuel capacity of tender	3 cubic feet
Tractive effort at 85% working pressure	663 lbs
Maximum height above rail level	4' 6 1/4"
Maximum length, over buffers,	16' 3"
Maximum width	2' 4"
Rail level to centre of boiler	2' 4"
Weight in working order, engine and tender	2 tons 15 cwt

APPENDIX TWO

Main dimensions of Bagnall rolling stock supplied with engine No 1425. Brake van built to general order No 249 and toastrack coach to No 244.

	Coach	Brake Van
Length over buffer beams	9' 0 5/8"	6' 0"
Height, from rail level	4' 0 1/2" (without awning)	5' 9 1/8"
Wheelbase	3' 4"	2' 10"
Wheel diameter	1' 0"	1' 0"

The coach could seat 6 persons but the brake van had seats for only one.

APPENDIX THREE — BIBLIOGRAPHY & SOURCES

Books: —

- Bagnalls of Stafford, Baker/Civil, Oakwood Press 1973.
- Miniature Steam Locomotives, Woodcock, David & Charles 1964.
- Model Railways & Locomotives, Greenly, 1924.

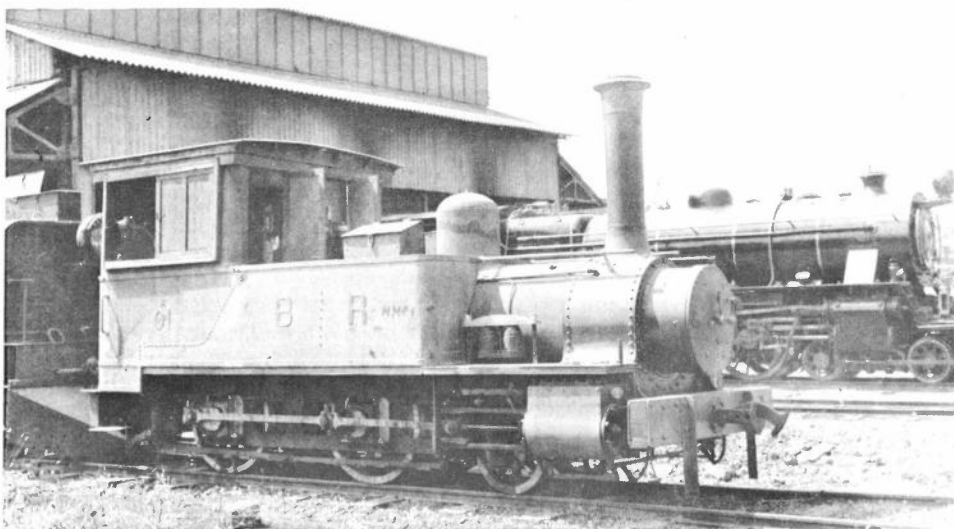
Magazines: —

- The Locomotive Magazine, 15/10/1927 and 15/1/1943.
- Railway World 9/1961.
- Railway Magazine 9/1936 and 11/1936.
- Model Engineer. (It is in this magazine that the most references appear, therefore I have included a breakdown of all issues consulted).

- | | |
|------------|---|
| 3/1900 | Article on Regent Street Polytechnic. |
| 12/4/1906 | Article on locomotive built by W. G. Bagnall. |
| 15/ 1/1923 | Article on E.F.S. Notter. |
| 11/10/1923 | Letter on the Bagnall single. |
| 1/11/1923 | ditto |
| 12/ 5/1932 | Details of loco at Fairbourne. |
| 2/ 7/1936 | Details of Jaywick loco by "L.B.S.C." |
| 16/ 7/1936 | Letter on Jaywick loco. |
| 30/ 7/1936 | Letter from H. Greenly. |
| 13/ 8/1936 | Letter on both engines. |
| 3/ 9/1936 | Article on opening of Jaywick line. |
| 10/ 9/1936 | Letter from W. G. Bagnall Ltd. |
| 19/ 2/1959 | Letters from C. F. Parsons and G. Woodcock. |
| 26/ 2/1959 | Letter on both engines. |
| 2/ 6/1967 | Article on Fairbourne Railway. (many inaccuracies here) |
| 21/ 7/1967 | Mention in Editorial. |
| 15/ 9/1967 | Letters on both engines. |
| 14/11/1974 | Letters on both engines. |

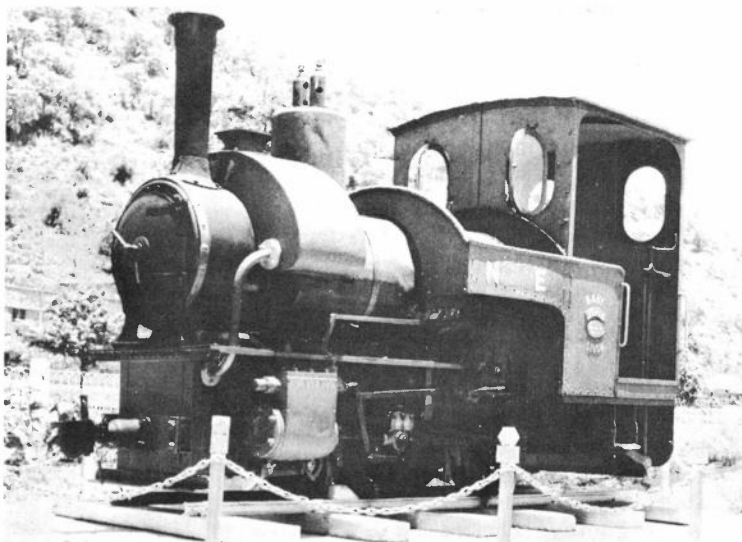
(There are other mentions but all the essential information will be found in those listed above)

OVERSEAS PRESERVATION



Burma Railways 2-4-0T 01. A standard Indian State Railways Class A 2-4-0T, this particular loco was built by Dubs (612/1873) as Indian State Railways No. A23 and worked on the construction of the Indus Valley State Railway from 1873 to 1875. In 1875 it moved to the Rangoon & Irrawaddy Valley State Railway, being renumbered 1 about 1878. The Rangoon & Irrawaddy Valley State Railway became the Burma State Railway in 1884 and Burma Railways in 1896. No. 1 was replaced in 1914 and became Insein Works shunter, numbered 01. In 1930 it went to the Government Technical Institute at Insein, and in 1937 was preserved at Rangoon Central Station. It is now preserved at Insein.

(Collection G.S.Moore).

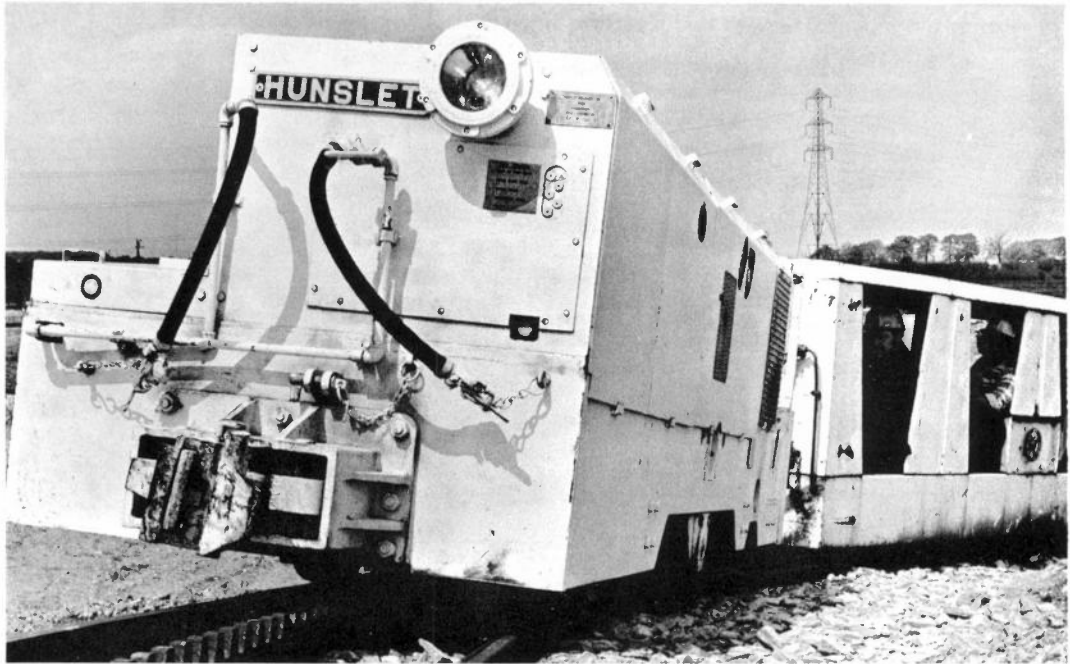


An unidentified Orenstein & Koppel (?) loco in India. Obtained for use on the Raipur Forest Tramway and later transferred to the Darjeeling Himalaya Railway. Although withdrawn from service before the takeover of the Darjeeling Himalaya Railway by the Indian Government Railways enough of it remained at the Darjeeling Himalaya shops at Tindharia for it to be rebuilt and used to haul two coaches around the fairground at the Indian Railway Centenary Exhibition in 1953. Later it was mounted on this plinth at Siliguri Station.

(Collection G.S. Moore).

THE HUNSLET RACK LOCOMOTIVE

M. Swift



The prototype Hunslet rack mines locomotive, showing clearly the offset engine compartment and the "Abt" rack between the rails. (National Coal Board).

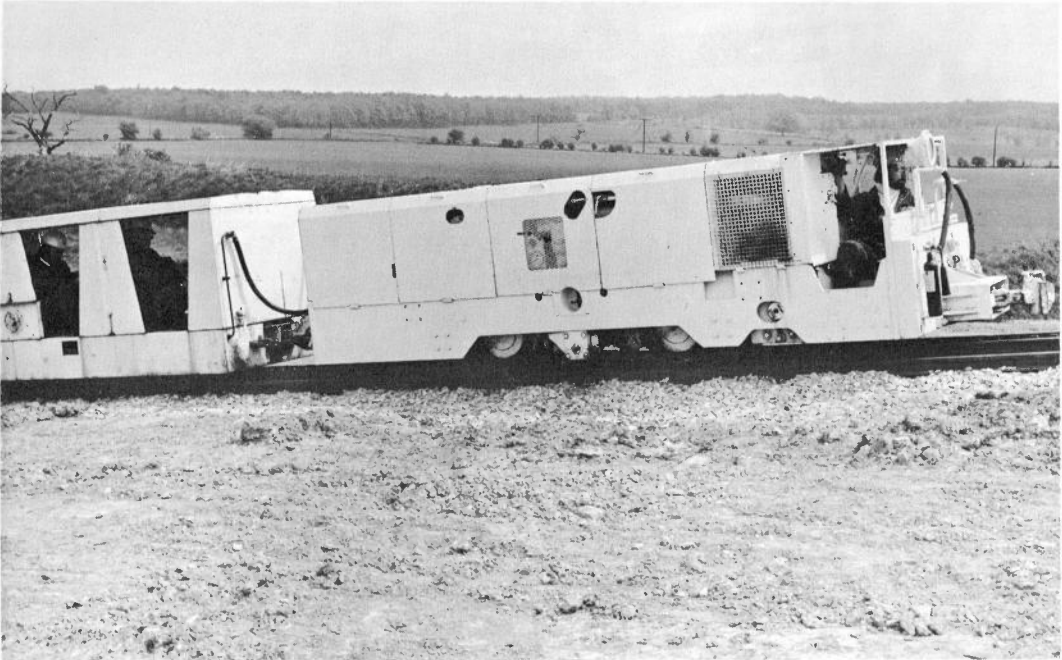
The application of rack and pinion drive to locomotives designed to work steeply graded railways is not new. In the light of this latest development however, it is interesting to record that the first locomotive of this type was built in Leeds in 1812 to haul coal from Middleton Colliery to Hunslet. A few other early locomotives were produced in South Wales for tramways serving the coal and iron industry, but despite this lead the concept was not developed further in Britain. It was therefore left to the Swiss locomotive builders to carry the idea forward with a variety of designs for their many mountain railways.

It is almost forty years since the first flameproof diesel locomotives were introduced for underground service in coal mines. These enabled the extension of underground rail systems substantial distances from the shaft, and the average colliery now hauls 5000 yards from the face to the shaft. Until now adhesion worked railways underground have been limited to gradients of 1 in 15 by the Mines & Quarries Act, and anything steeper required cable haulage with the attendant extra handling of rolling stock. To overcome this problem a number of suspended or supported monorail systems have been developed during the past ten years, but the introduction of such specialised systems has been limited to a few collieries.

In the early 1970's the North Yorkshire Area of the National Coal Board started to examine the problem of handling men and materials over steeply graded underground roadways. Almost all the collieries in the area are already equipped with rail systems, so a natural choice was development of a new locomotive which could work either on these or over steep gradients. The Hunslet Engine Co. Ltd. were approached, and agreed to undertake the design of a rack and adhesion locomotive which would meet this requirement. In their long history, Hunslet have produced many special locomotives, including the "Lartigue" monorail 0-3-0 type for the Listowel & Ballybunion Railway, well known to members. Final design work commenced about three years ago, based on an initial order for four locomotives, and the first prototype, Hunslet 7488/1977, was completed early this year.

The locomotive is constructed to suit the restricted loading gauge underground, and has four driving wheels and two pinions which engage with a single "Abt" type rack mounted centrally between the running rails. The prototype runs on 610mm (2ft) gauge, but can be modified to run on any gauge up to 914mm (3ft). The engine compartment is offset to one side of the frame allowing reasonable visibility from the end driving cab when running in reverse.

A Perkins 6354 diesel engine developing 90 h.p. at 2250 r.p.m. is fitted, driving through a specially designed Lucas swashplate hydrostatic transmission, to either the wheels or pinions as required. This type of drive was selected in preference to mechanical transmission because it gives an infinitely variable ratio and the additional safety of allowing the engine to be used for full braking when descending gradients.



*The Hunslet rack locomotive with a demonstration train on the test track at Ledston Luck Colliery, near Castleford.
(National Coal Board)*

The leading dimensions and tractive effort with adhesion and rack drive are as follows:

Length without couplers	4660 mm (15ft 3 ½ in)	Weight	11600 kg (11.4 tons)
Width overall	1370 mm (4ft 6in)	Maximum axle load	6000 kg (5.9 tons)
Height overall	1370 mm (4ft 6in)	Minimum weight of rail	23 kg/m (50 lb/yd)
Wheel diameter	610 mm (2ft)	Minimum radius curve	10 m (35ft)
Wheelbase	1360 mm (4ft 5 ½ in)	Maximum power	90 h.p. at 2250 r.p.m.
		Fuel capacity	78 litres (17 gallons)
Tractive effort: (Adhesion)		Tractive effort: (Rack)	
Maximum starting	1730 kg (3800 lb)	Maximum starting	4000 kg (8800 lb)
Up to 10 k.p.h. (6.25m.p.h.)	1730 kg (3800 lb)	Up to 4.25 k.p.h. (2.5m.p.h)	4000 kg (8800 lb)
At 16 k.p.h. (10 m.p.h.)	1071 kg (2360 lb)	At 8 k.p.h. (10 m.p.h.)	2100 kg (4700 lb)

The haulage capacity is impressive for such a modest sized locomotive. On the level it will start and haul a train weighing 460 tons at speeds up to 10 k.p.h. (6.25 m.p.h.), or 113 tons at the same speed up a gradient of 1 in 50. These loads are based on roller bearing stock, used in most modern coal mines. The increased resistance of plain bearing stock reduces the maximum load by about 55%. In rack drive it is designed to haul 56 tons up 1 in 20 at 8 k.p.h. (5 m.p.h.), 39 tons up 1 in 15 at 8 k.p.h., 22 tons up 1 in 10 at 4.8 k.p.h. (3 m.p.h.), and 8 tons up 1 in 6 at 3.2 k.p.h. (2 m.p.h.) The maximum gradient it will work is 1 in 4, but the N.C.B. do not anticipate operating on gradients steeper than 1 in 8 initially. On test a train loaded to 5.35 tons has been hauled up a 1 in 4 gradient.

Although the locomotive can be used with existing conventional rolling stock, an additional standard chassis has been developed which can be used for man-riding or material wagons. This incorporates a hydraulic brake acting on the rack. A remote control system is also provided allowing the locomotive to be controlled by a man at the coal face, an important safety feature when reversing in confined spaces.

To prove the new locomotive a special test track has been laid on the surface at Ledston Luck Colliery near Castleford. This has a circuit about ½ mile long with gradients of 1 in 10 and 1 in 4, and a 10 metre (35ft) radius curve. Final approval trials commenced in April, as a joint venture by Hunslet, the North Yorkshire Area of the N.C.B., and the Board's Research and Development Centre at Bretby in Derbyshire. Before entering service underground, the locomotive must also be approved by the Government Health and Safety Executive. However, the N.C.B. has sufficient confidence in the design to increase the order to eleven locomotives valued at over £50,000 each. The first is expected to enter service at Kellingley Colliery, near Castleford in September, and others will be delivered to nearby Wheldale and Fryston, and to Maltby and Manton collieries in South Yorkshire.

This new development in narrow gauge rail transport holds great promise for speeding materials handling in the coalfields. For the Hunslet Engine Co. Ltd., it is yet another milestone in locomotive engineering, with great potential in this country and abroad, proving once again that a simple concept gives the best solution to a complex problem.

The assistance of the National Coal Board, North Yorkshire Area is gratefully acknowledged for providing most of the information contained in this article.

NARROW GAUGE GRANDEUR



Scindia State Railway 2' 0" passenger train passing through arid country en route from Gwalior to Shivpuri in February 1974, headed by a Class NH/5 2-8-2 built by Nippon in 1959, works no. 1783.
(L.A. Nixon).

FIRST ON THE SOMME—1916 THE HUDSON/HUDSWELL 0-6-0 WELL TANKS FOR THE WAR DEPARTMENT

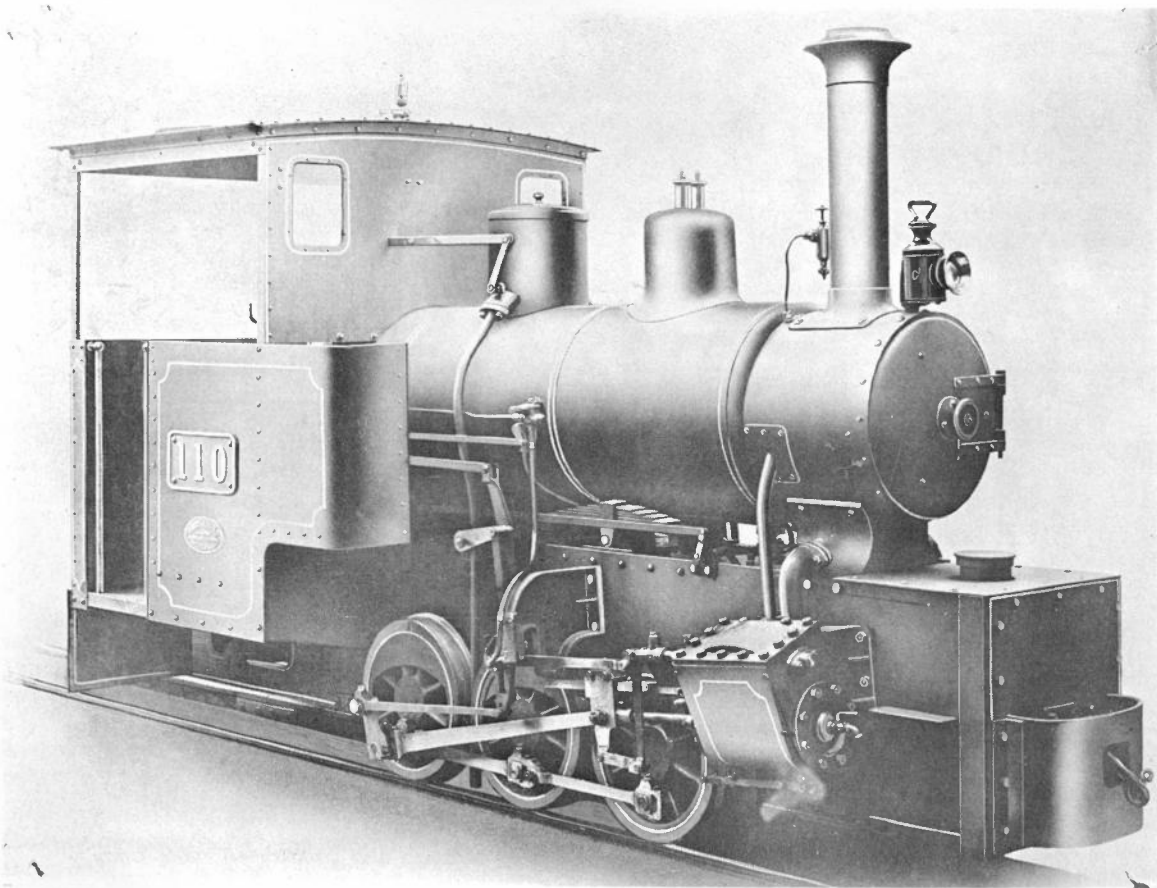
HISTORY — R.N. Redman

DRAWING — W.A.D. Strickland

After the Germans and French had successfully demonstrated the usefulness of light railways using the "Decauville" gauge of 60cm (1ft 11.5/8ins) to bridge the gap between the standard gauge railways and the front line, it was only a question of time before the British Government belatedly followed suit.

At the outbreak of the first World War the British locomotive building industry had full order books and all spare capacity was soon taken up with munition or similar war work of a non locomotive nature.

The immediate demand was for a light and simple, but robust locomotive, and inevitably one of the first sources tried was Robert Hudson Ltd. of Leeds whose works at Gildersome near Leeds dated back to 1865, and was the most established manufacturers of light railway equipment in the country. Despite all their experience in this specialised field, to date they had not attempted to actually build any locomotives, and relied in the main on the services of Kerr Stuart & Co. Ltd. or the local experts Hudswell Clarke & Co. Ltd. and the Hunslet Engine Company, and between the years 1911 to 1929 had 188 narrow gauge locomotives built at the Railway Foundry of Hudswell Clarke's, most of them being well tank designs with the water tank carried between the frames to give a low centre of gravity ideally suitable for working on the often far from perfect track found on overseas light railways, plantation and industrial lines, the main customers of Robert Hudson's over the years.



Works official photograph of WDLR 110, HC 1219 of July 1916.

(R.N. Redman collection)

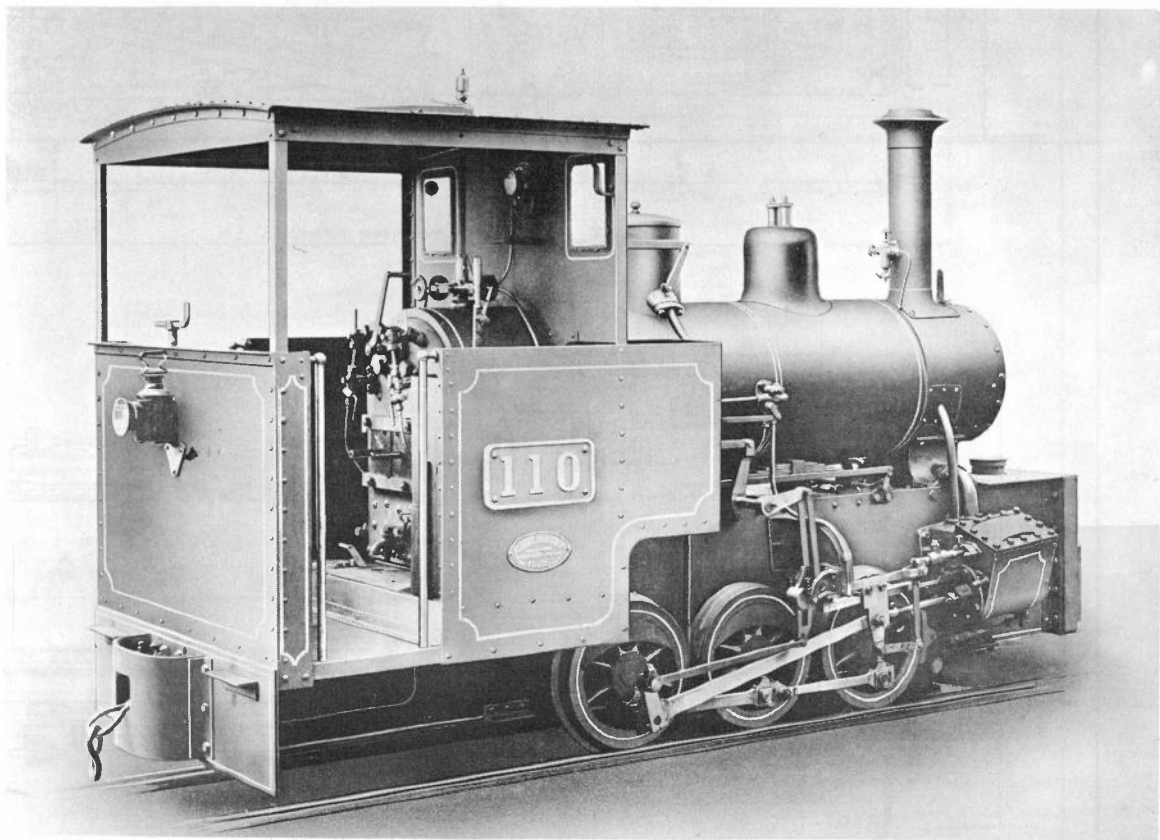
Hudsons & Hudswells put forward to the War Office an 0-6-0 well tank design capable of working on 20lb rail at a cost of £460.00 per locomotive and received an order for four of them, to be passed to Hudswells during October 1914 on Hudson order No. 19805, along with two 2ft 6ins gauge versions for supply via Martin & Co. for the Delhi Public Works Dept., India. As an indication of the work load going through Hudswell's erecting shop at the time with essential standard gauge industrials and contractors engines for aerodrome and army camp construction, the four 0-6-0's did not leave Jack Lane until May and June 1916 and carried works numbers 1112 — 1115 as well as W.D. plates numbered 101 to 104. All were despatched to Dover Harbour for shipment to France, at least one of which No. 102 worked on the first steam worked 60cm gauge British line, in the Fricourt area of the Somme offensive late in 1916 to serve ammunition dumps and gun positions.

Production increased once the initial four left the works and their success prompted repeat orders from the War Office which eventually ran to 77 locomotives, 10 of which were for 2ft 0in gauge, most of them seeing service in France and Salonica. The largest single order was for thirty off to Hudson order No. 20292 dated 11/8/1916 and these left the works at the rate of about one per week mixed in with similar 0-4-0 well tanks for general camp and aerodrome construction work.

Despite their light construction many of the locomotives survived "the war to end all wars" and passed into private ownership to give many years of service and prove themselves nearly indestructable, and no doubt to this day one or two will be pottering about in some remote corner of India. Needless to say any additional information or photographs of these interesting machines would be more than welcome to complete the story.

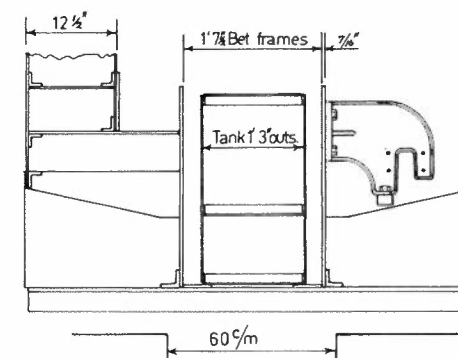
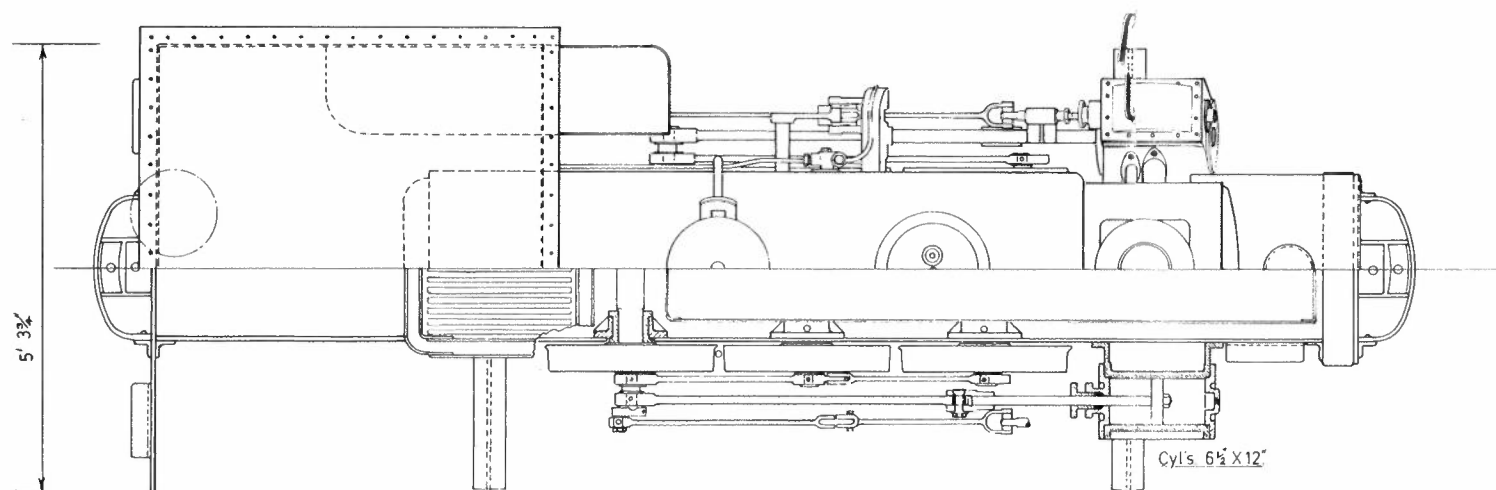
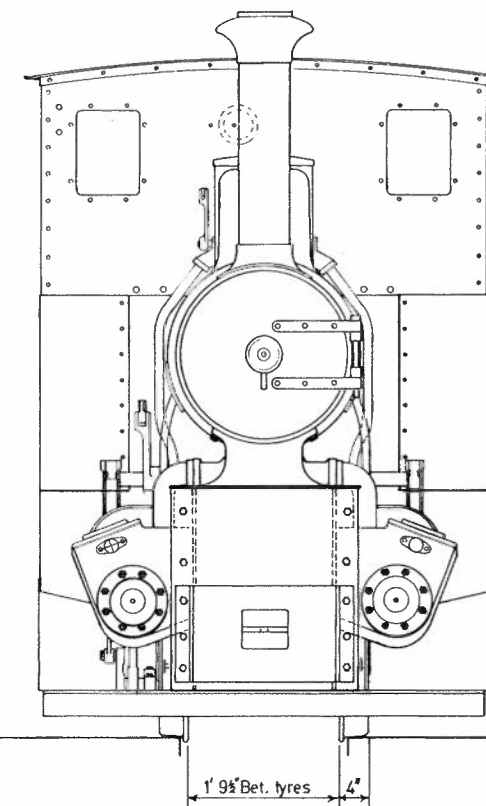
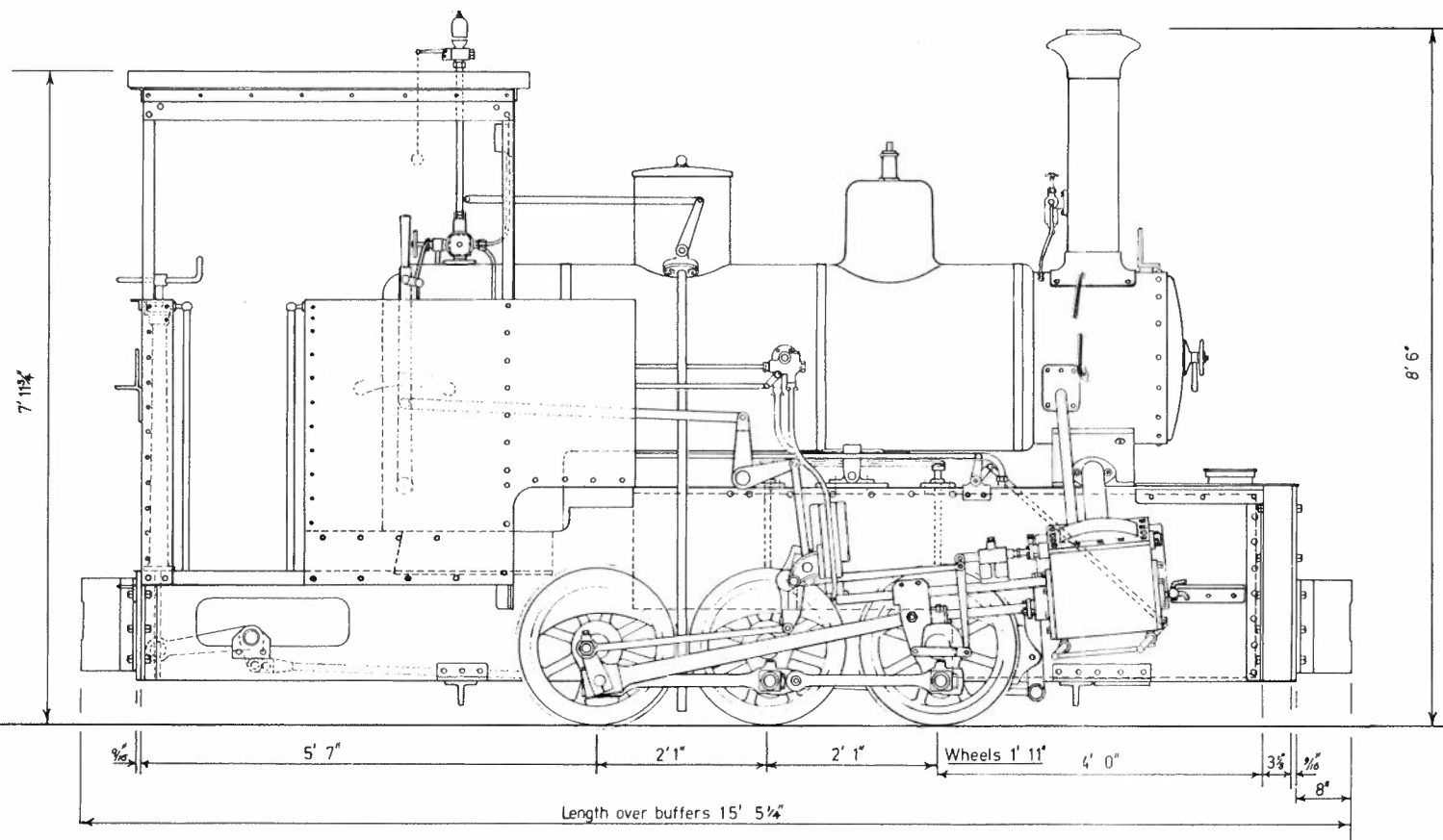
The list of the class and subsequent owners where known has been built up with assistance from the old works records of Hudswell Clarke & Co. Ltd. and the order book of Robert Hudson (Raletrux) Ltd.

In closing may I thank for their invaluable assistance Bill Strickland for his superb drawing, Geoffrey Horsman, Andrew Neale, Geoffrey Moore, and Mr. A. Waud & Mr. R.J. Chadwick of Robert Hudson (Raletrux) Ltd.

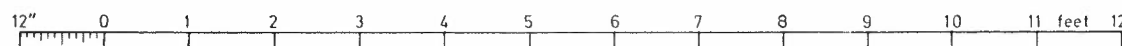


Trailing view of HC 1219/16

(R.N. Redman collection)



HUDSWELL / HUDSON CLASS "G"
 0-6-0 W.T. LOCO. 60"/m GAUGE.
 W. D. N° 110. Works N° 1219-1916.
 Drawn from the HUDSWELL CLARKE original by W.A.D. Strickland.



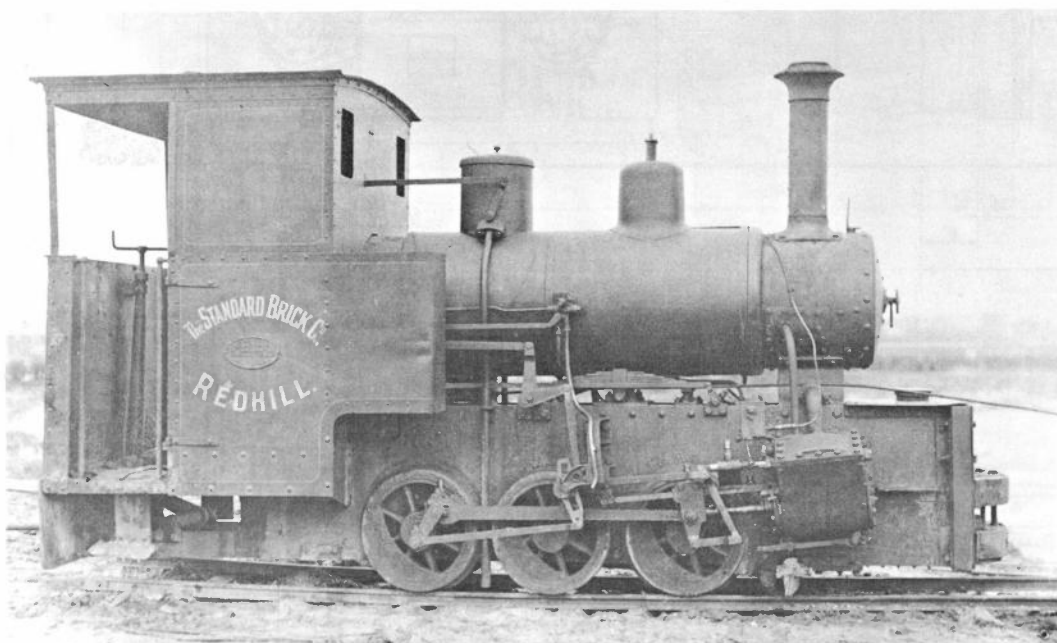
W.A.D. Strickland
 1/10/13

SPECIFICATION OF LOCOMOTIVES

Rail Gauge	600mm or 2ft 0ins	Heating Surface — Firebox	17.5sq ft
Diameter of Cylinders	6½ ins	Tubes	108.5sq ft
Length of stroke	12ins	Total	126 sq ft
Diameter of Wheels	23ins		
Length of Wheelbase	50ins	Grate Area	3¼ sq ft
Capacity of tank	110 Gallons	Tractive force	2909 lbs
Capacity of Bunker	7 Cubic feet		
Weight Empty	13,664 lbs	Radius of Sharpest Curve	
Weight in working order	16,430 lbs	The engine will traverse with ease	65 feet
Valve Motion	Walshaert Type		
Working pressure	180lbs per sq in	Weight of Lightest Rail Advisable	18lbs per yard
		Nominal Speed	6 to 7 M.P.H.

Maximum hauling power in tons (of 2,240lbs) on varying grades in addition to its own weight.

Level	1 in 100	1 in 40	1 in 30	1 in 20
150 tons	77 tons	35 tons	26 tons	16 tons
Boiler Details	5ft 6ins barrel x 2ft 1 ins diameter. Plates 'SIEMENS — MARTIN' Mild steel 3/8ins thick. Tube plate 5/8ins thick Tubes 45 in number of steel 1ins outside diameter, expanded both ends and beaded over at fire box end. Tested to 270lbs per sq ins hydraulic pressure and 200lbs per sq ins steam pressure. Lagging with yellow pine battens, and finished with sheet iron casing.			



One of the most travelled of the Hudswell "class engines" was HC 1314. Delivered new in June 1918 to the 2'0" gauge system at R.A.F. Kidbrooke, S.E. London, it then followed a varied career in the 20's with various West Country owner's before being sold via Peckett's of Bristol (where it presumably went for an overhaul) to the Standard Brick Co Ltd. at Redhill, Surrey, where it was photographed in service by the late George Alliez on 19th. April, 1935. It was later replaced at Redhill by a fleet of Ruston diesels which worked the system until its final closure in late 1963 or early 1964. It has been suggested that HC 1314 came to Redhill via contractor's Sir Lindsey Parkinson & Co. Ltd., but this may be due to confusion with the other "class engine" that worked at Redhill. This was HC1461, an identical 2'0" 0-6-0WT built for stock in 1922 but only delivered to SLP on 17th. July, 1929 and sold by them to Redhill in 1936.

(The late G. Alliez, courtesy B.D. Stoyell).

HUDSON HUDSWELL 0-6-0WT LOCOMOTIVES BUILT FOR THE WAR OFFICE

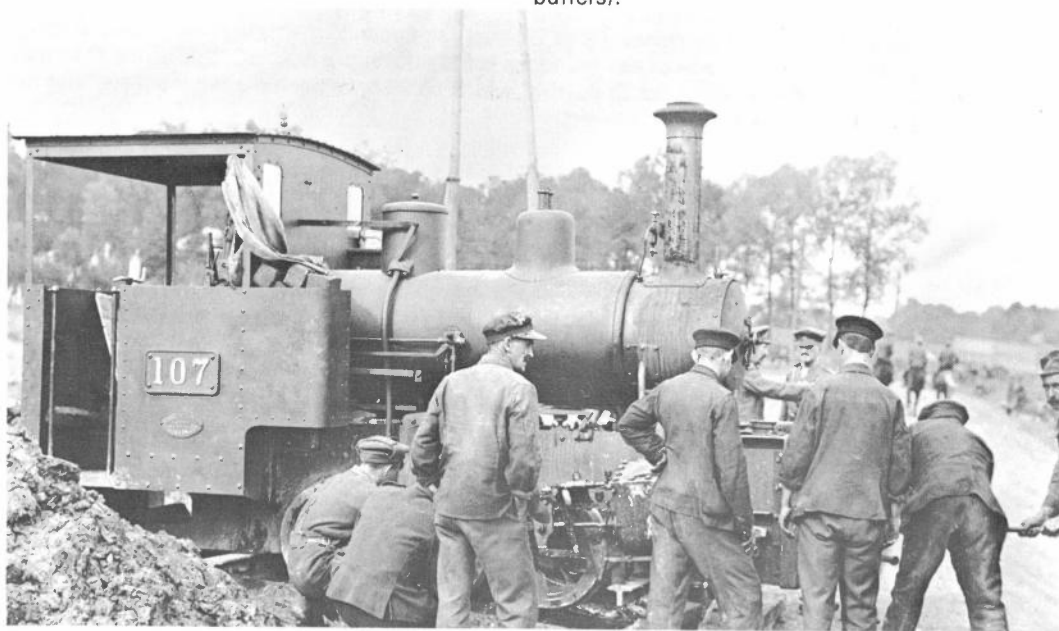
<i>Hudswell Clarke works number</i>	<i>Date ex works</i>	<i>W.D. number</i>	<i>Delivery address and subsequent owners</i>
1112	6/1916	101	War Office
1113	5/1916	102	War Office
1114	6/1916	103	Dover Harbour
1115	6/1916	104	Dover Harbour
1186	6/1916	105	Dover Harbour
1187	6/1916	106	Dover Harbour
1216	7/1916	107	Dover Harbour
1217	7/1916	108	Dover Harbour
1218	7/1916	109	Dover Harbour
1219	7/1916	110	Dover Harbour
1220	7/1916	111	Dover Harbour
1221	7/1916	112	Commandeered by War Office Contracts and despatched to Sandwich, Kent.
1226	8/1916	113	Salonica Camp via Liverpool docks.
1227	9/1916	114	Salonica Camp via Avonmouth docks
1228	9/1916	115	Salonica Camp via Avonmouth docks. To Palestine Electricity Corporation, 1927 via Hudson Order No. X2054
1229	9/1916	116	Salonica Camp via Avonmouth docks.
1230	9/1916	117	Salonica Camp via Avonmouth docks. To Empresa Agricola Lugella via Hudson. Order No. X734. via Hudson. Order No. X734.
1231	10/1916	118	Salonica Camp via Avonmouth docks.
1232	10/1916	—	Dover Harbour
1233	10/1916	—	Dover Harbour
1234	11/1916	—	Dover Harbour
1235	11/1916	—	Dover Harbour
1236	11/1916	—	Dover Harbour
1237	11/1916	—	Dover Harbour
1256	12/1916	—	Dover Harbour
1257	12/1916	—	Dover Harbour
1258	12/1916	—	Dover Harbour
1259	12/1916	—	Dover Harbour
1260	1/1917	—	Salonica Camp via Canada Dock, Liverpool.
1261	1/1917	—	Salonica Camp via Canada Dock, Liverpool. Reconditioned and converted to 2ft gauge by Hudswell Clarke. To New Consolidated Gold Fields, South Africa, 4/10/1928 via Hudson. Order No. CP06179.
1265	1/1917	—	For Salonica Converted to 2ft gauge. To Chakas Kraal Sugar Co. Ltd., Natal, South Africa via Hudson. Order No. CP2784.
1266	1/1917	—	For Salonica
1267	2/1917	—	For Salonica
1268	3/1917	—	For Salonica
1269	4/1917	—	For Salonica
1270	4/1917	—	For Salonica
1271	4/1917	—	For Salonica Reconditioned and converted to 2ft gauge. To New Consolidated Gold Fields of South Africa Ltd., Waterval Platinums Ltd., 3/11/1928 via Hudson. Order No. CP06230
1272	5/1917	—	War Office
1273	5/1917	—	War Office
1274	6/1917	—	War Office
1275	-/1917	—	War Office
1276	-/1917	—	War Office At The Gladdow Coal Co.

1277	-/1917	—	War Office At Sir Lindsay Parkinson & Co. Ltd., Section No.2, Liverpool Road, Haydock, St. Helens, 4/12/1929.
1278	-/1917	—	War Office To Palestine Electricity Corporation Ltd., 1927 via Hudson. Order No. X20504.
1279	-/1917	—	War Office.
1280	-/1917	—	War Office
1281	-/1917	—	War Office
1282	-/1917	—	War Office At Noeux les Mines, Pas de Calais, France.
1291	6/1917	—	Salonica Camp
1292	6/1917	—	Salonica Camp
1293	7/1917	—	Salonica Camp
1294	7/1917	—	Salonica Camp
1295	7/1917	—	Salonica Camp
1296	7/1917	—	Salonica Camp
1297	7/1917	—	Salonica Camp
1298	7/1917	—	Salonica Camp To Moorewood Colliery Co. Ltd., Oakhill, near Bath, Somerset, c.1922 via Hudson. To Stanley Engineering Co. Ltd., Bath, 7/1933. To Sutton Sand Co., Kildare, Ireland, 6/1934.
1299	8/1917	—	Salonica Camp
1300	8/1917	—	Salonica Camp
*1301	1/1918	—	Didsbury Aerodrome, Alexandra Park, Manchester. At R.A.F. Kidbrooke, London, 1925, Named BENNEFRY Edzell Aerodrome, Angus, Scotland. To Kharung Division, Bilaspor C.P., India via Hudson.
*1302	1/1918	—	Dublin for Cookstown Aerodrome, Co. Dublin, Ireland.
*1310	4/1918	—	At Glenfarne Estate Railway Co., Co. Leitrim, Ireland.
*1311	4/1918	—	Baldonnel Aerodrome, Lucan, Co. Dublin, Ireland. At Cookstown Aerodrome, Tyrone, Ireland. To Kharung Division, Bilaspor C.P., India via Hudson.



WDLR 102 in active service on a British military light railway in the Somme area. Note the two varieties of C class bogie wagon. These were an early type of wagon, produced before the decision was taken to standardise rolling stock.

*1312	4/1918	—	Naval Stores Department, Aberdeen.
*1313	4/1918	—	Harpwell Aerodrome, Kirton in Lindsey, Lincs. To Satpuria & Asanal Collieries, India via Hudson. Order No. X537
*1314	6/1918	—	Kidbrooke Aerodrome. London. At Nott, Brodie & Co., Avonmouth, Glos., contractor for Bristol-Avonmouth Portway Road. To P. & W. Anderson Ltd., contractor for North Devon & Cornwall Light Railway, Torrington-Halwill, 1923-25. Named WESTERN LEA. To Meeth (North Devon) Clay Co. Ltd., c.1925. To Peckett & Sons Ltd., Bristol, c.1929. To Sir Lindsay Parkinson & Co. Ltd. To Standard Brick & Sand Co. Ltd., Redhill, Surrey, 1929.
*1315	9/1918	—	Marske Aerodrome, North Yorks. At Courtaulds Ltd., Holywell, Flints. (?) To Kharung Division, Bilaspur C.P., India via Hudson.
*†1316	10/1918	—	Officer in Charge, Chepstow, Mon. At Sir Lindsay Parkinson & Co. Ltd., St. Helens. At Delabole Slate Co., Delabole, Cornwall. Scr. c.1930.
1317	10/1918	—	Royal Engineers Experimental Station, Porton, Wilts. At Sir James Boot, Nottingham, 1924. At Wm. Moss & Son, Loughborough, 1925. Derelict at Surrey Dock Station, London, 1/1923. Number 22 painted on (Reputedly owned by the Liver- pool Artificial Stone Co. as No. 22)
1318	11/1919	—	Railway Wharf, Purfleet, Essex.
1319	11/1919	—	Railway Wharf, Purfleet, Essex. At Sir Lindsay Parkinson & Co. Ltd., Section No. 2, Liverpool Road, Haydock, St. Helens, 4/12/1929.
1328	2/1919	—	Railway Wharf, Purfleet, Essex, (Fitted with French buffers).



W.D. 107 derailed on the crossing over Albert to Fricourt Road. September 1916.

1373	2/1919	—	Railway Wharf, Purfleet, Essex. At Solitude Estate, Mauritius according to Hudson report 24/7/1930.
1374	2/1919	—	Railway Wharf, Purfleet, Essex. At location in Sudan according to undated Hudson report X238.
1375	4/1919	3205	Railway Wharf, Purfleet, Essex. Recorded as for disposal at Purfleet 25/11/1919. To Empresa Carbonifera do Douro, Minas de Pejao, Pedorido, Portugal. Named PEJAO.
1376	4/1919	3206	Railway Wharf, Purfleet, Essex. At Oporto, Portugal according to undated Hudson X282. (Same location as 1375?)
1377	5/1919	3207	Consigned to War Office, but possibly not delivered. Converted to 2ft gauge. To Leighton Buzzard Light Railway via Hudson. Order No. 23098. To Bryant & Langford Quarries Ltd., Portishead, 1922. To R. Fielding & Son, Warbreck Hill Brickworks, Blackpool, possibly via T. W. Ward Ltd., Sheffield.
1378	5/1919	3208	Consigned to War Office but possibly not delivered. Converted to 2ft gauge. To Leighton Buzzard Light Railway via Hudson. Order No. 23098. To Bryant & Langford Quarries Ltd., Portishead, 1922. At T. W. Ward Ltd., Sheffield, 2/3/1927.

Notes:

*Built as 2ft gauge.

"Industrial Locomotives of Northern France" (Industrial Railway Society, 1962) suggests that up to 10 Hudson 0-6-0WT locomotives worked at Societe F. Beghin, Vis en Artois, Pas de Calais. All were ex WDLR and were disposed of before 1956.

"Industrial Railway Record" No. 57, (Industrial Railway Society, 12/1974), illustrates an unidentified Hudson 0-6-0WT, probably ex WDLR, working on a 60cm gauge line from a pulp and paper mill at Kuusankoski, Finland, about 1930.

†During the 1914-20 period the Admiralty had a 2ft gauge system serving sand and gravel pits at Frampton-on-Severn, Gloucestershire, and when this closed locos offered for auction on 25/10/21 included a 2ft gauge 'Hudson' 0-6-0. This was presumably one of the HC locos listed above, possibly HC 1316 since Frampton-on-Severn lies a few miles across the Severn from Chepstow, which could have been merely the place that ordered the loco, not the site to which it was actually delivered.



*A workmens special about to leave Baldonnel Aerodrome for Lucan Station on the G. & S.W.R.
(W. McGrath collection)*

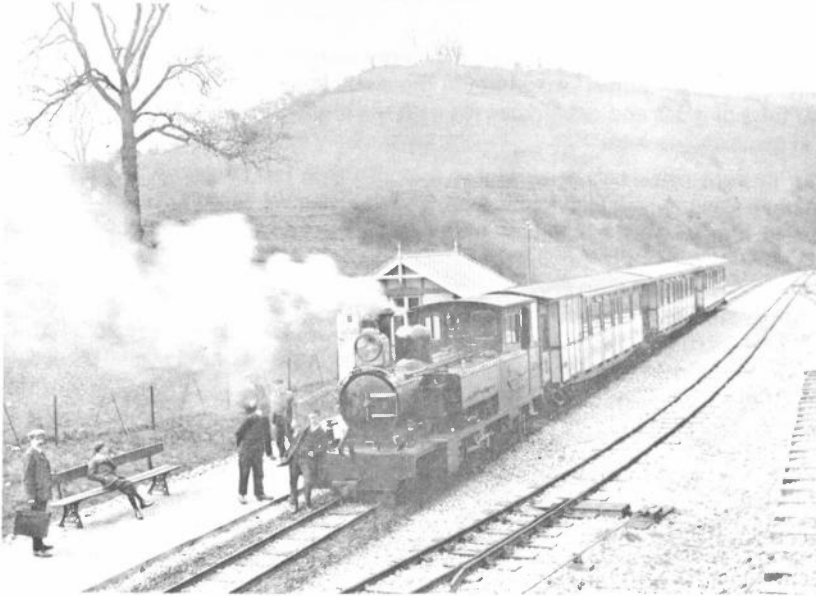
DOWN MEMORY LANE

K.P. Plant

Earlier this year, on one of my regular secondhand bookshop visits, I picked up a small book published in Sheffield in November 1933 by J.W. Northend Ltd. and entitled "The Peak: Some Places and People". In it B. Casson sketched and J. Thornton wrote about some of the more exquisite parts of the Peak District which was "looked upon by the Sheffielder as his exclusive Property". Today, forty years after Sir Josiah Stamp officially opened the footpath on the former trackbed, it is nostalgic to ride the Leek & Manifold during its last summer of operation. Forget the errors and enjoy the experience: —

"ALONG THE MANIFOLD VALLEY RAILWAY"

"I have found a railway. It is about twenty miles long and has ten stations. It took me one and a quarter hours to reach it by car from Sheffield, fifty minutes to go the full length of the line, half an hour's rest, and fifty minutes back. There was a day of adventure for you!



An attractive view at Wetton Mill Station.

"I found Hulme End Station as we turned a corner of the road two miles from the village of Hartington. The railway rejoices in the name of The Leek and Manifold Valley Light Railway. This is on a brass plate on the engine, which, when I arrived, was puffing softly to let the engine driver know that all was well and ready for the start.

"The engine driver, meanwhile, was sitting on the kerbstone, which marks the difference between the platform and the railroad, reading his morning paper.

"He was a cheery soul, with very blue eyes and white teeth, and he enjoys his railway. I am quite sure of that. It has existed since 1904, and he has spent nine years as driver, so he knows a good deal about it. At one time, he told me, the railway was the "Milky Way" of the district. Hundreds of gallons of milk were carried from its little stations to the main line. Now there is no great distribution of milk, but Manchester "hikers" love the railway, and so do the holiday parties, who leave their charabancs at Hulme End and do the railway trip while the cars proceed by a longer road to Waterhouse, and there pick them up.

"About 500 holiday makers, mostly from the Potteries, travel on this line on August Bank Holiday. There are three trains a day, one in the morning, the next at 1 p.m., and the third at 4 p.m. I booked for the lunch-time train, and had three companions, a lady, a gentleman and a little boy.

"There was an air of great peace over the station until about 12.50, when everyone seemed to get busy at once. The stationmaster and a porter suddenly remembered about a load of coal and a couple of carriages which should be elsewhere, so the engine driver got busy and his mate began shunting these obstacles.

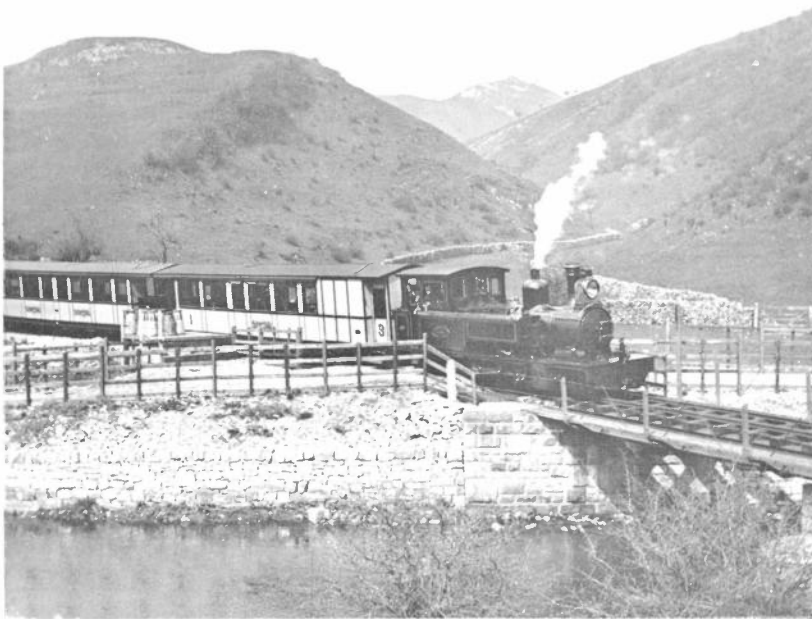
"Now this railway is a small gauge affair, but the coal wagons are of the ordinary size, so they have to be brought along on "transports," which are iron platforms fitting the small gauge lines to take the wagons. There is one siding with ordinary gauge, and the wagons had to be landed there while the extra carriages had to be put in the shed, in case they were blistered by the sun. All this took twenty minutes and the guard didn't like it. He wanted to run to time. At 1.20 we were off down the valley of the lost rivers. The coach was divided into first and third class. There was a slight difference in the upholstery, and as the engine ran backwards on this journey, the first class got more smoke which didn't really matter, as we were all third class passengers.

"My companion, the photographer, deserted me for the front of the train, where he stood on a little platform to get some of the views. I watched the beauties of the Manifold Valley, softly rounded hills, with wooded slopes, a river with crystal clear water, a profusion of wild flowers. We passed a field where a snow-white tent shone in the sun, and we rolled along in the heart of the valley.

"The engine driver ignored the stations on the way out; we passed Ecton (for Warslow) almost before I noticed it. Several of the stations were not marked by buildings, merely by name signs, and others are important enough to have sheds for shelter. Butterton was next, and then a tunnel. Then Wetton Mill, where children with bouquets of forget-me-nots waved to us from a nearby field.

"Somewhere near here I noticed that we no longer saw the river, only a dry watercourse, which we crossed and re-crossed for the rest of the way. Dry, dusty stones looked hot in the sun, plantations spread their shade over the dry river, and here and there tufts of grass and dried moss were on the rounded stones, while the well-built stone bridges looked quite out of place and useless.

"We came to Red Hurst Crossing. In front I saw hills grow higher and lose their roundness. A sharp peak towered above us and we reached Thor's Cave, which was high up on the left. Then we came to Grindon, and then to Beeston Tor, then to Sparrowlee, and we were running out of the valley to see a wider sweep of country.



Redhurst crossing

"We had to cross a main road and that took time, as the fireman got down and closed the gates against the traffic. After he had climbed back into the engine we moved on a little, and the guard opened the gates and climbed back into the carriage. We moved on again, and in a minute or two drew up at Waterhouse, where the railway finds its big brother, the Leek Railway. Here, too, we saw the river again.

"I asked the guard one or two questions about the stream, but he was not talkative and I was little the wiser. But on our return to the train I met those cheery fellows who drive the engine, and they described the days when the watercourses were full. They told me that had I walked a short distance from the village, I should have seen the water of the Hamps suddenly disappear underground. Where it comes out no one knows. The Manifold does not present so great a mystery. It disappears near Wetton and comes out at Ilam, but the Hamps, after the pretty village of Waterhouse, disappears for good.



A train passing Thors Cave Tea Rooms.

"As we came back through the valley I pondered over this story. It is a fairy story in real life—the valley of the lost river, with its lovely woods and rich fields, its wild roses and forget-me-nots, and meadow sweet. Its loveliness seems to smile at the mere humans who cannot know the secret of its river. The flowers and the trees and the birds could tell of the watercourse, for in the quietness when no fussy little train with its freight of noisy human beings is about, they may hear the trickle of water underground.

"I was awakened out of this dreamland by the train drawing up with a jerk. No one got off, no one got on, but the guard, the engine driver and the fireman exchanged greetings with a pretty girl who was making hay in the field beside the railway. I do not wonder that they wanted to talk to her, she looked so cheery and brown and happy. Her rounded arms were a lovely brown against the lighter colour of her dress, and her wavy hair was unshaded by hat and unspoiled by "perm." We went on again but pulled up at Wetton, where the children with the forget-me-nots climbed aboard; they waved to the engine driver as he opened his little window and took coals from the tiny tender. Two men got on board, and as we had seven passengers instead of five, we were quite a company.

"The guard came and took our tickets in silent sternness. How stupid we were to be excited or even interested in the valley he went through several times a day! The engine driver bade us a cheery "good-bye" as we stepped out of the train, and hoped that we had enjoyed the run. The children waved their flowers at him and ran off laughing.

"Rumour has it that this line is to be closed, but no one could tell us if this really was the case. The railway will go on; the engine puff its way with its load of carriages and passengers, sometimes half a dozen, sometimes a hundred. But the Manifold Valley is lovely and mysterious, with its unknown railway and its lost rivers.

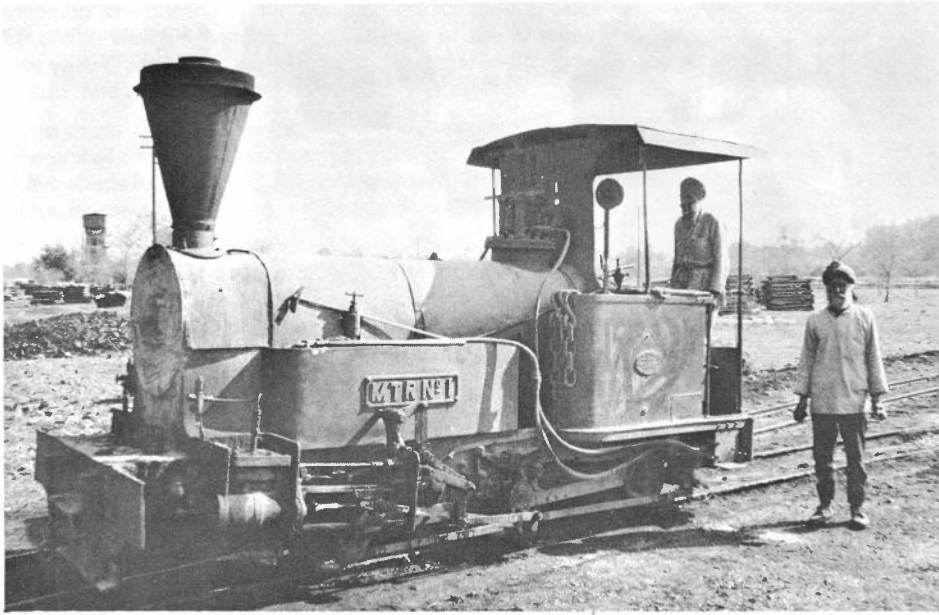
"As we got into the car we took a look back at the green hills, with their fine trees, at the outline against the sky, and we turned to go towards the real world, for this ended our adventures on a day when we found a railway and lost two rivers."

MINIATURE RAILWAY AT BELFAST: The Belfast Corporation Tramways Committee has constructed a 15 inches gauge railway, about 1 ½ miles in length at Bellevue, the site of the municipal zoo and playground on the slopes of Cave Hill, Belfast. The locomotive used is a 0-4-0 tender tank, formerly No. 4 of the Romney, Hythe & Dymchurch Railway. It has been named Sir Crawford after Sir Crawford McCullagh, the Lord Mayor of Belfast.

("The Locomotive Magazine", July 14th. 1934).



AN INDIAN DISCOVERY



Member Mike Satow's latest find is a pair of Dick Kerr 0-4-2 inverted saddle tanks, probably the last surviving examples of locos fitted with Morton's valve gear. They are employed on the 2'6" gauge system at Dhillwah Sleeper Depot in the Punjab. Both are ex Kharachi Port Trust, MTR No. 1 dating from 1908 and its sister engine from 1910. (M.G. Satow).



BLACK SHEEP of the HIMALAYAS

C. R. Weaver

Everybody has their off days and it would be foolish to pretend that the British railway industry didn't have its off days even at its zenith. The disappointing results of these occasional lapses are as interesting as the more numerous successes, partly because the resultant correspondence, if kept by the builder, provides one with more information than is usually the case. One of the more unusual designs of railcar produced by Baguley Cars Ltd for the Drewry Car Company was the pair of 2-4-2 cars supplied to the 2ft 6in Kalka-Simla Railway in 1921. Everyone concerned—except perhaps the Drewry representatives in India—seems to have had an off day at some point in their history.

The Kalka-Simla Railway is not a particularly easy line to operate, nor to design equipment for. Sixty miles long, and rising to an altitude of 6808ft at Simla, it has long stretches of 1 in 33 ruling gradient and almost continuous curvature down to 120ft radius—so severe in fact that at many points the curvature and superelevation are reversed completely within the wheelbase of a vehicle. Faced with such a line, and with only a limited demand for a relatively fast passenger and mail service, the management were obviously unhappy about running "express" trains hauled by separate locomotives and well before the first World War had decided to operate such services by petrol railcars. A prototype, built by Lloyd, Plaister & Co., was obtained around 1910 and subjected to rigorous trials. Only one weakness was revealed—the twisting of the chassis caused by the sudden reversals of superelevation fractured the engine crankcase. Lahore Works of the North Western Railway modified the engine mounting to a flexible three-point arrangement to overcome this twisting and when this proved successful three further cars based on the modified prototype were ordered from the same builder in 1912.

These cars—known as "White & Poppe" cars from the make of engine—were four-wheeled with one axle driven, having a four-cylinder 30hp engine and carrying 11 passengers and a driver. The all-up weight was 3.6 tons and the wheelbase, 6ft 3in, was as long as the curvature would permit. First put into service in 1914 these railcars were still going strong ten years later and were used as a basis for the specification of two larger railcars put out to tender in 1919.

The new requirement was for two 16 seat cars capable of making the trip from Kalka up to Simla at 18mph overall. Among other details, they were to be fitted with six-cylinder engines for smoothness and the seats were to be raised in tiers after the manner of a char-a-banc so that the passengers could see where they were going. (The railcar, like most supplied to the Indian narrow gauge railways, would be single-ended and turned between trips.) Other requirements were for the body to be open above the waist but provided with a canopy and windscreens, for the upholstery to be leather. If the car was four wheeled the wheelbase must not exceed 6ft 3in and the axles must be coupled to eliminate the slipping occasionally experienced with the older cars, but a 4-4-0 or 2-4-2 wheel arrangement would also be considered. The altitude and gradients to be encountered were emphasised, the air at Simla being of only 77% the density of that at sea level thus reducing the power output of the engines. It was also required that the carburettors be fitted with a separate air inlet so that the engine could be used as a compressive brake on the descent.

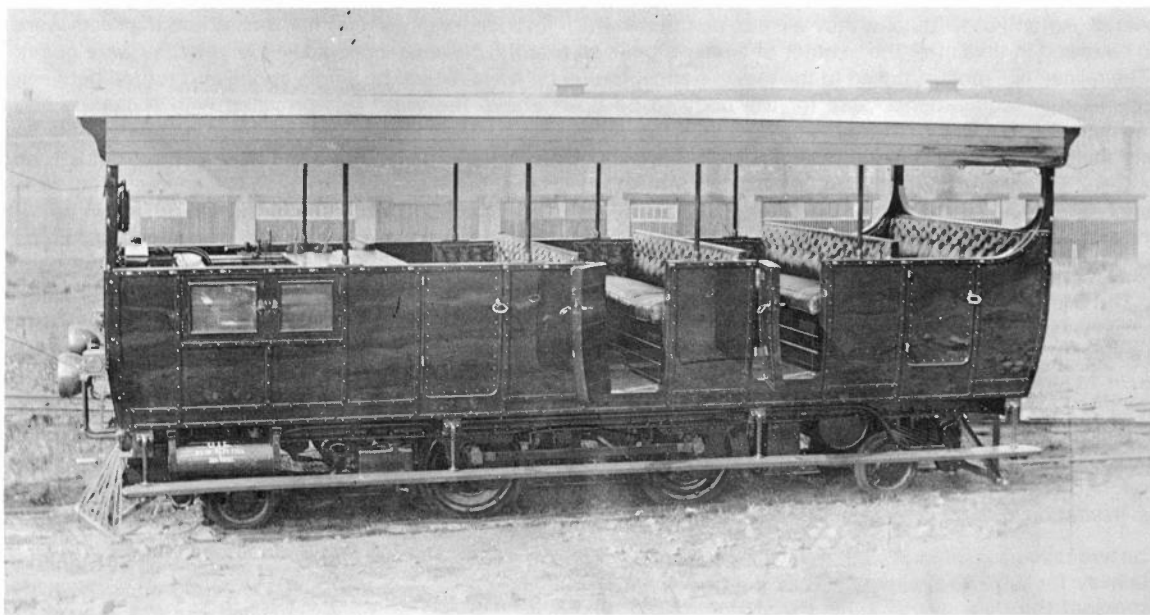
The Drewry Car Company tendered for this order, two designs being drawn up by Baguley Cars Ltd. The first, which was the one actually submitted on the form of tender, was for an 0-4-0 railcar of 6ft wheelbase fitted with a six-cylinder Baguley engine of 4 1/2 in bore x 5 in stroke rated at 45/50 hp, a three-speed gearbox and silent chain drive to one axle, the other axle being driven through coupling rods. This was not considered particularly satisfactory, however, because of the overhang at each end and an alternative design on a 2-4-2 chassis was submitted as well. This would have a wheelbase of 12ft, the coupled wheelbase being only 4ft 6in. The outer ends of the chassis were carried on Bissel trucks of orthodox design. The cars were 18ft long and 7ft wide and weighed 6t 2cwt 3qtr when finished, for the Kalka-Simla's consulting engineers (Rendel, Palmer & Tritton) had no hesitation in recommending the revised design to their clients and an order was placed at once.

The two railcars were built as Baguley Nos 903 and 904, and the chassis of 903 was taken to the Leek & Manifold Railway for preliminary trials before the body was fitted—though how the Leek & Manifold could possibly represent the Kalka-Simla is hard to imagine. The only real tests carried out were those conducted with the finished cars on the short 1 in 24 test hill behind Baguley's works in Shobnall Road, Burton on Trent. The cars were then crated and despatched, 903 on 9th June 1921 by the s.s. *City of Newcastle* and 904 on 30th June 1921 by the s.s. *City of Rangoon*. On arrival at Karachi the cars were sent up to Kalka and unpacked. Then the fun started.

Before describing the various misfortunes that befell the cars it is interesting to examine the "lines of communication" through which the faults were, or should have been, fed back to the builders. The Indian Railway dealt with the normal builders—the Drewry Car Company—through their consulting engineers Rendel, Palmer & Tritton, while the Drewry representatives in India, Heatley & Gresham, also reported back to London. Baguley Cars Ltd were only informed through Drewry at first, but when rumours started to filter back that all was not well they apparently contacted Heatley & Gresham who sent their Mr. J. Evans to investigate. His report to Baguley has been my main source of information about the cars after their arrival in India.

Evans arrived at Kalka to meet a hostile reception. The staff there were annoyed that although they had had the cars for over a year (this was in December 1922) they had experienced nothing but trouble, the cars had not completed a single trip on a scheduled run, and nobody from the builders or consulting engineers had been near them or even offered any help. Evans was able to produce copies of reports sent back to London by Heatley & Gresham to prove that they had been doing their part, but as to the silence of the Drewry Car Company he could offer no explanation. In fact he was as annoyed about it as anyone and did not conceal his feelings.

The trouble had started as soon as they unpacked car No 5 (Baguley 903). The engine would not run properly and the clutch had been incorrectly assembled. When the car was tried on the line it was found to be short of power and quickly demonstrated a tendency to derail on curves. The engine was so down on power that the car often stalled part of the way up the line and had to be brought back very slowly in reverse. Only three attempts were made to use one of the cars in regular service: on two trips the car stalled for lack of power and on the third it derailed. No 6 seems to have been less troublesome than No 5, though perhaps this was because they had concentrated on the latter to iron out the snags. At length, just before Evans's visit, No 5 failed completely and was taken into the works at Kalka for a complete overhaul, the local, highly experienced railcar gang being assisted by engineers from Lahore Works. Evans saw the dismantled car and was appalled by it. The crankshaft was badly scored—due to incorrect alignment in his opinion—the magneto drive gears had fractured due to poor material, the piston rings appeared to be of the wrong material and did not seal properly and other details were in need of improvement. But it was the Bissel trucks which came in for the worst criticism—the Newlay integral wheels, much favoured by Baguley and by the Indian railways were worn out after less than 2000 miles.



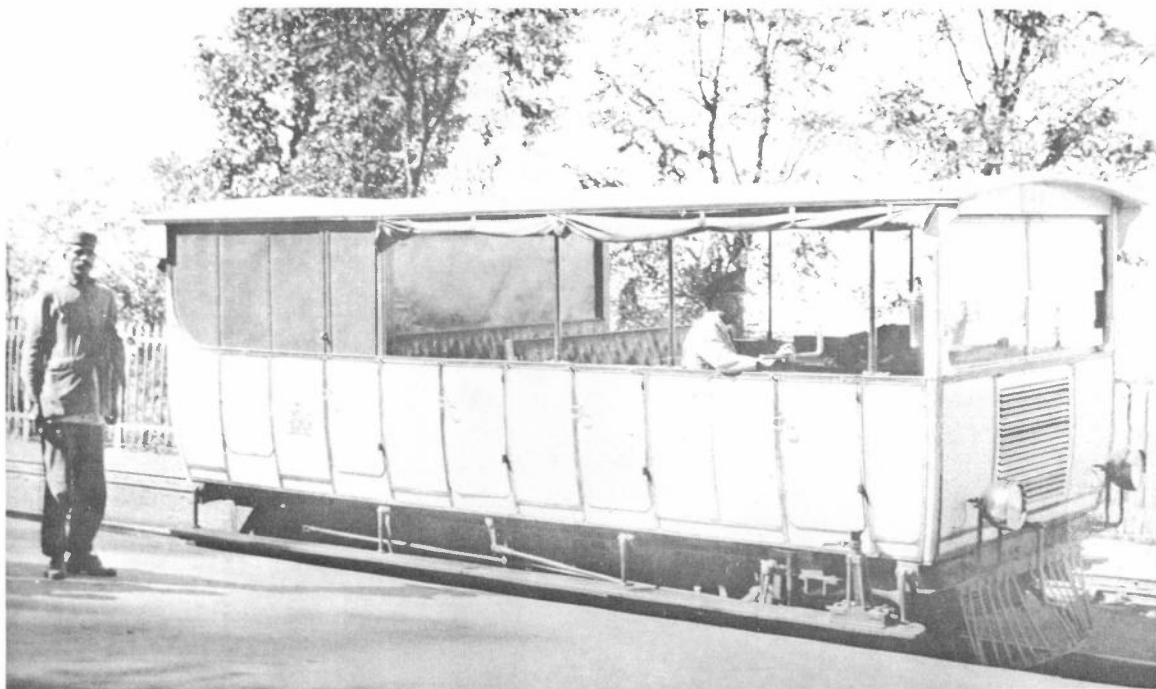
Baguley 903 on the test track at Shobnall Road Works.

(Baguley—Drewry Ltd.)

Evans did not pursue the matter of the engine—Kalka and Lahore had sufficient experience of petrol engines to put that right—and concentrated on the Bissel trucks which he considered were at fault both on account of tyre wear and of derailment. It came out that the 2-6-2 tanks built for the Kalka-Simla had been just as bad when first delivered and that over 200 derailments were recorded every year. Lahore had rebuilt the pony trucks to cope with the particular conditions and by 1922 derailments were down to about five per year. Perhaps it was significant that this information had not been given to Baguley when the original specification was issued.

Evans considered that the excessive wheel wear was caused by the trucks having too stiff side control springs so that the cars behaved more like a long-wheelbase four wheeled vehicle than an articulated one; this opinion was backed up by the fact that although the truck wheels were worn out the driving wheel flanges were unmarked. This stiffness would also account for the tendency to derail, while the layout of the suspension over the trucks was considered by Evans and by the staff at Lahore to be a further cause; as the trucks turned weight was transferred to the inner wheel allowing the outer to climb up the rail. He prepared drawings showing how the pony trucks of the 2-6-2 tanks had been altered and also how the springing of the railcar trucks could be modified to achieve the same effect.

A further complaint concerned the special high-altitude Zenith carburettors fitted to the engines. The compensation equipment was similar to that used on an aero engine, and an Indian Air Force officer had pointed out that on aero engines the compensation did not take effect until the aircraft was above 7000ft—some 200ft above the upper point on the line! This was no good, for whereas an aircraft can absorb a drop in power because the thinner air produces less drag, the railcars had to overcome resistance that was not dependent on altitude. The correct course of action was not to fit special carburettors but to fit engines which developed their rated power at maximum altitude and ran at part throttle lower down the line. Evans felt that Baguley's estimate of 50bhp to propel the cars was probably right and that the lack of compression in the cylinders due to defective piston rings was the main cause of the drop in power, not the altitude. (Baguley in fact reckoned on developing 65bhp at 1250 rpm to propel the cars at 22.5 mph up a 1 in 33 gradient and would probably have enough in hand to absorb the effects of altitude, if the engines behaved properly.)



No.6 (Baguley 904), after rebuilding with a mail compartment, in service on the Kalka-Simla Railway, 10th October, 1927.
(Bournemouth Railway Circle, W.H.C. Kelland collection. Courtesy M. Smith).

Evans's report stirred people into action and he was summoned back to London for a meeting with Baguley, Drewry and the consulting engineers. His recommendations were accepted and Baguley asked to prepare replacement Bissel trucks to his design to be sent out to Kalka as soon as possible. Quite clearly Drewry had become concerned at the possible damage to their image, for Evans had hinted that unless something was done urgently to get the railcars into traffic Drewry would stand no chance of being considered when a further batch of railcars was ordered in two years' time to replace the 1914 cars.

At this rather critical point in their career, 903/4 disappear from Baguley records, but their story can be taken further by reference to North Western Railway records and I am indebted to Hugh Hughes for supplying me with the relevant extracts. The NWR records are fairly comprehensive, but do contradict certain points in the documents at Burton. For example, there are records only of two larger cars fitted with White & Poppe engines, N.W.R. No 4 being in fact a Baguley railcar on a completely different part of the system. Although these cars were, like the 1910 prototype, built by Lloyd, Plaister & Co Ltd they were extensively rebuilt and re-engined by the N.W.R. before going into regular service which doubtless explains the application of the title "White & Poppe" to them rather than the name of their original builders.

Nos 5 & 6 after their disastrous start, were successfully rebuilt and went into regular service in 1923 or early 1924. Their days on purely passenger duties were numbered, however, and following the arrival of three larger bogie railcars in 1927 they were rebuilt with a mail compartment occupying the rear two rows of seats, reducing the seating capacity by half. The two larger "White & Poppe" cars were also rebuilt as mail vans at the same time (Railcar No 1 had always been a mail van) and in this guise the earlier KSR cars saw a **few** years more service, but following the arrival of more bogie cars all five of them were withdrawn in 1932-34, exact dates for each car not being recorded.

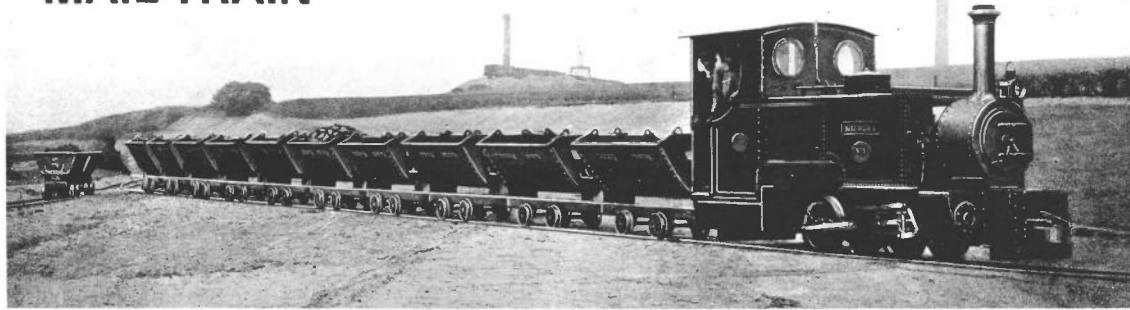
That the 2-4-2s were reasonably successful after their rebuilding is deduced from the origin of the *force majeure* that descended upon the railcar fleet in 1927, for this took the form of three Baguley articulated railcars ordered through the Drewry Car Company. All of these, together with a fourth of the same design built by English Electric at Preston in 1931, are still in service virtually unaltered apart from the fitting of diesel engines. Clearly the strictures uttered in 1922 had sunk home, and having finally discovered what the KSR was really like Baguley took care that there was no repeat of the fiasco. Were the 2-4-2s a mistake? In retrospect perhaps they were, but one should not judge them by their relatively short life: some of the diesel streamliners built in the 1930s had even shorter lives and there is no question of their success. It is perhaps more accurate to regard them as a disappointing design whose limitations pointed the way to one of the outstanding railcar designs of all time.

POSTSCRIPT TO POLAND



Martin Murray's article on Narrow Gauge Railways of the Polish Sugar Beet Industry did not include a photograph of a Las 0-6-0 tank. These are the largest class on Polish industrial railways, 800 being built between 1946 and 1959. Chrzanow 2762/1951 awaits the next season at Lubna on 26th May. 1976 (Bo Gyllenberg)

MAIL TRAIN



THREE LITTLE KNOWN ENGINES

The three 20 H.P. Simplexes mentioned in Rodney Weaver's letter in NG 75 were certainly not the only narrow gauge Motor Rails owned by the LMSR. Another was 5029, a 2½ ton 2ft gauge 20 H.P. petrol loco supplied in October 1929 to the Engineer's Dept., Stoke-on-Trent. No doubt perusal of Motor Rail's records will reveal others. Incidentally, 5029's near sister, 5031, also went to a 'main line' company. In January 1930 it was delivered to the GWR Resident Engineer's Depot at Banbury.

FARNBOROUGH, HANTS.

ROBIN PEARMAN

THE SIERRA LEONE GOVERNMENT RAILWAY

I very much enjoyed the article on the S.L.G.R. (NG 74) but Mr. Moore's statement that..."The Mountain section.....had the distinction of being the steepest non-funicular railway in existence, the maximum gradient being 1 in 22." is asking for trouble. The Plynlimon and Hafan Tramway had no less than eight gradients in excess of this; the steepest being 1 in 18.3. It also had a one mile run where the average gradient was 1 in 20.9. Beat that on a passenger carrying railway!

KENSINGTON, LONDON

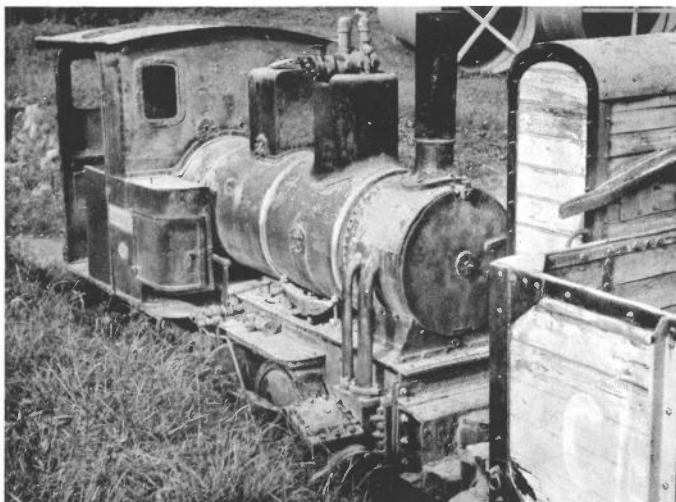
E.A. WADE

PENLEE—A RIDDLE SOLVED

The PENLEE article was most interesting and shows that mysteries of long standing can be solved! I enclose a copy of my only photograph of a Freudenstein, 60/01 a metre gauge 0-4-0WT at Cementos Rezola, S.A., Anorga near San Sebastian on the electrified metre gauge Vascongados main line to Bilbao. The locomotive was named ANORGA No. 2. It would also appear to have several features in common with PENLEE—the rectangular cab windows, sloping top to the valve covers, the pattern of the wheels and the short, narrow running plate.

LIVERPOOL

J.A. PEDEN



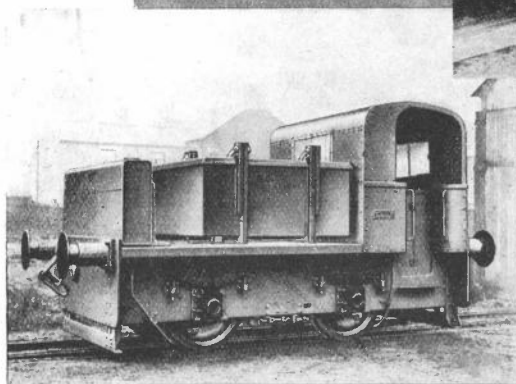
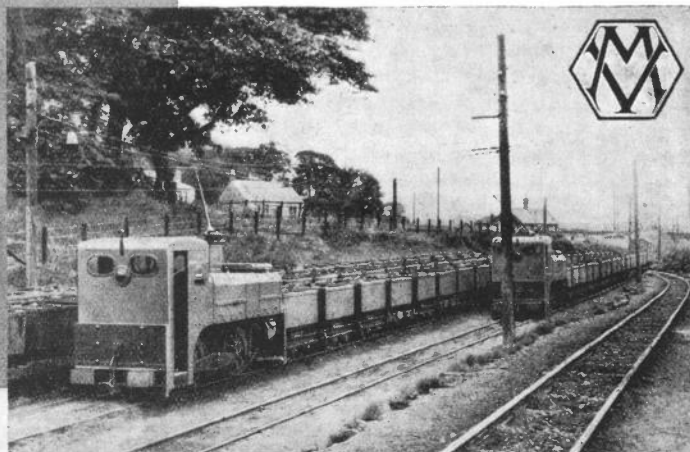
*Freudenstein 0-4-0WT ANORGA
No.2 lies out of use at Cementos
Rezola, S.A. on 23 September, 1960.
(J.A. Peden)*

INDUSTRIAL SHUNTING Service

Compared with steam or oil locomotives, the Metrovick Electric Locomotive presents the following advantages:—

- ★ Absence of noise, dirt, fumes and fire-risk.
- ★ Readiness for immediate operation, wasting no fuel while idling.
- ★ Elimination of coal and ash disposal.
- ★ Minimum of skill required for operation.
- ★ Superior tractive characteristics and exceptional overload capacity for starting on gradients.
- ★ High and smooth acceleration at all loads and accurate inching.
- ★ Electric braking available.
- ★ Minimum cost of maintenance.

Two 12-ton, 2 ft. 6 in. gauge, 500 volt shunting locomotives in service in an oil works.



A 13-ton battery type shunting locomotive for a steel works.

Leaflet No. 584/1-1 gives full details—may we send you a copy?



by  **METROVICK**
ELECTRIC LOCOMOTIVES

For speedier transport in the factory

METROPOLITAN
Vickers
ELECTRICAL CO. LTD.
TRAFFORD PARK ... MANCHESTER 17.

K/L301

This Metrovick advertisement from "The Railway Gazette" shows the railway at Winchburgh Shale Mines of Oakbank Oil Co. Ltd., West Lothian, Scotland.