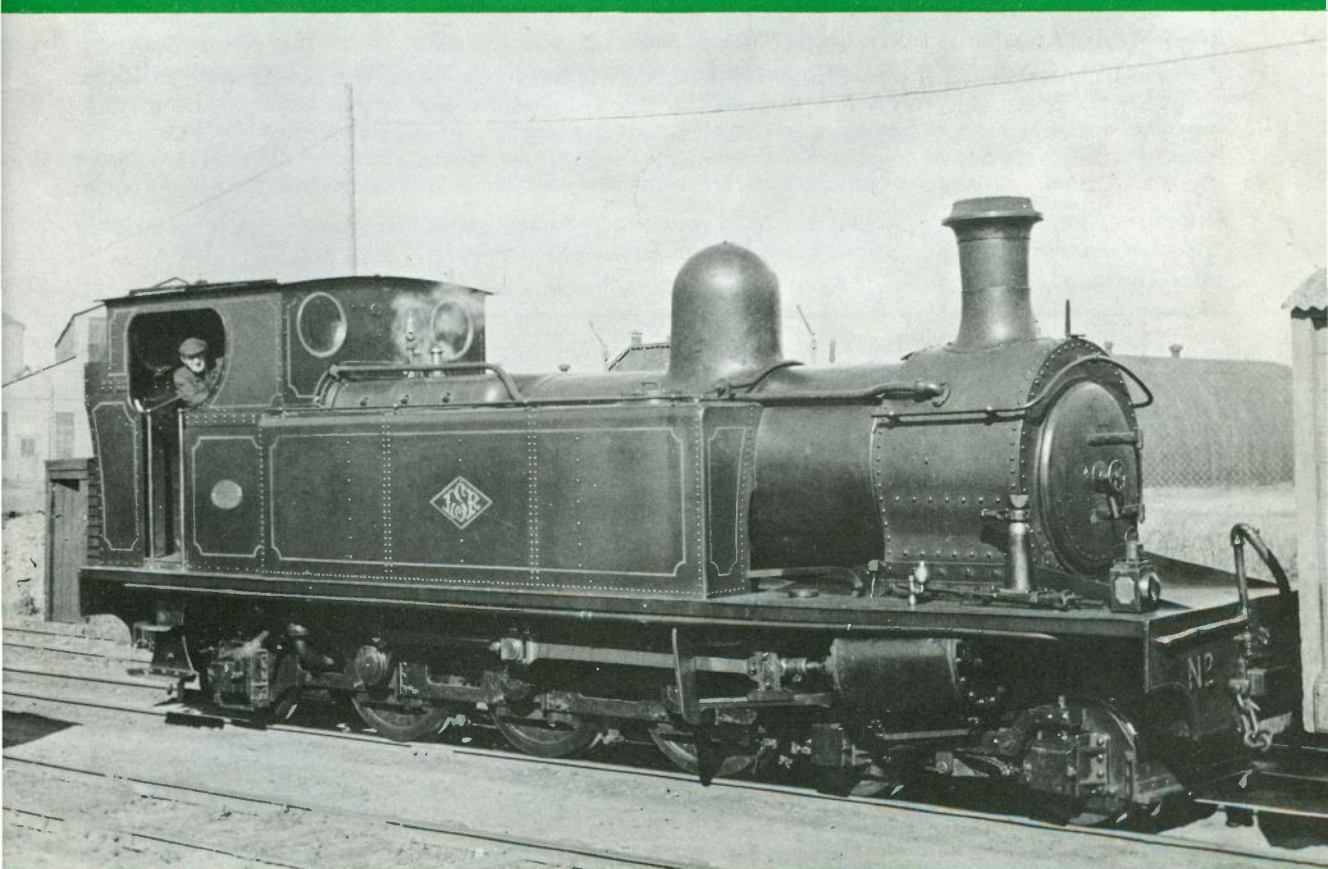
THE NARROW GAUGE

No. 83



NARROW GAUGE RAILWAY SOCIETY

NARROW GAUGE RAILWAY SOCIETY

Serving the narrow gauge world since 1951

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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

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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.

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

EDITORIAL

No 83 SPRING 1979

I must admit to feeling a little guilty about collecting the Winter issue of *The Narrow Gauge* from our printer towards the end of March, when the planned publication date was February. However, what is normally an easy fortyfive minute trip across the Pennines turned into a hazardous journey through an arctic blizzard, and only the weight of the magazines ensured my safe return! There was no doubt that whatever the date, winter was definately still with us.

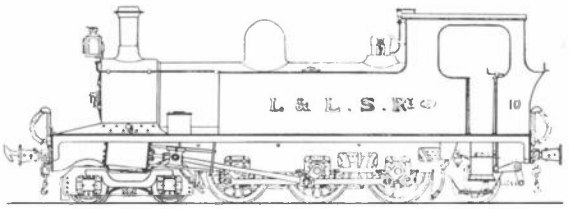
A few days earlier Andrew Neale and I visited the Moseley Industrial Narrow Gauge Tramway, where the effect of heavy rain, frost and snow on the condition of the track-bed was clearly very severe. Attempting to repair the ravages of winter in the pouring rain is sufficient to deter all but the most dedicated preservationist, and it seems likely that some operations will start their 1979 season with the winter maintenance programme incomplete. However, as a complete contrast I visited the Hampshire Narrow Gauge Railway Society—only three weeks later—in warm, sunny weather and found that they had been spared the worst of the weather and had made considerable progress on the restoration of two locomotives.

Descriptions of the practical aspects of preservation can provide a valuable interchange of experience, in addition to recording the dedicated work of the few for the pleasure of us all. I welcome any articles on this topic, and will continue to include them as an interesting and useful contribution to *The Narrow Gauge.*

Cover: Spotless and well maintained right to the end, Lough Swilly 15 stands in Londonderry station one day in May 1951. In our leading article, P.S. Halton captures some of the atmosphere of a line few of us were fortunate enough to visit. *(R.C. Riley)*

LOUGH SWILLY MEMORIES

P.S. Halton



The railways of north west Ireland were unique, and the Londonderry and Lough Swilly—or "The Swilly" as it was always known to its patrons—was probably the most fascinating of all. Part of this fascination probably lay in its very remoteness, which placed it just beyond the reach of young enthusiasts in the thirties.

To a fifteen year old the summer of 1939 was really quite good, or at least it seemed to be when looking back. The weather was perfect and the then relatively new hobby of railways had resulted in my brother and I travelling away from our home area in search of steam locomotives. The highlight of that summer was to be an excursion from Leeds to Edinburgh about the middle of August. Leaving late on Friday night you had thirteen hours in that city and arrived back in Leeds early on Sunday morning, all for the princely sum of 10/6d (52½p). It was an excellent trip,but the advertisements in the local paper had others to offer, among them an excursion to Belfast for 12/6d, (62½p) leaving on Friday afternoon and returning to Leeds by mid-day on Sunday. This obviously started some interesting thoughts, and the possibilities which this excursion presented were thoroughly examined. Our guide was a handed-down copy of the R.C.T.S. *"Locomotive Stock Book"* which not only listed the main line railways but also the 'other railways'. It clearly stated that the L. & L.S. was 3ft gauge, which was interesting in itself, and had an eight coupled tender locomotive and some similar tank locomotives; even more interesting. We studied the timetables and discovered that there was sufficient time in Ulster to travel to Londonderry, see the Swilly's locomotives, and return to Belfast in time for the boat back to England. On 6d (2½p) a week pocket money it was not going to be possible to go that summer but there was certainly the summer of 1940—or so we thought!

The Swilly as it was: No.2 bustles across Pennyburn level crossing with a passenger train in June 1937. *(H.C. Casserley)*

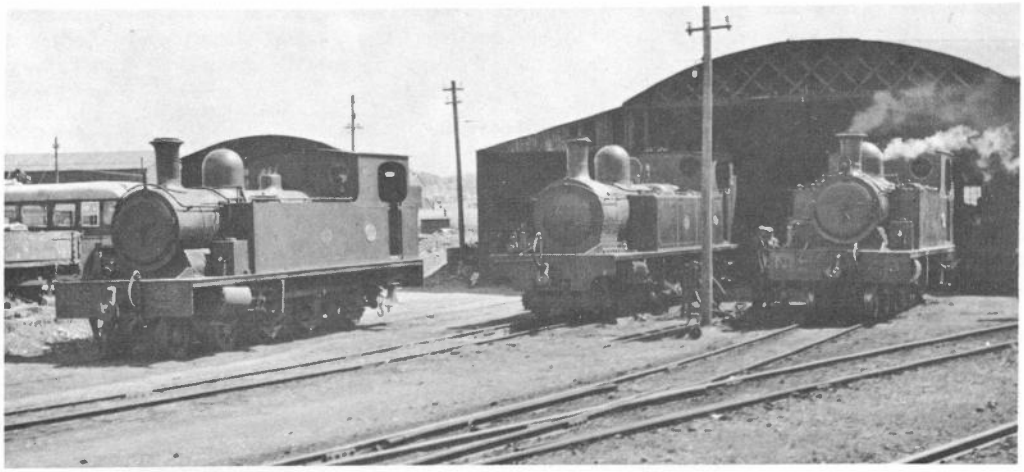
We finally sailed on the 14th August 1951. "We" had changed somewhat because by then I was married and about to subject my wife to her second experience of the railway hobby. My brother was now living many miles away. The Swilly also had changed. At its maximum extent the system reached from Graving Dock station in Londonderry to Tooban Junction, where it divided to run north to Buncrana and Carndonagh; and south, then west through Letterkenny to Gweedore and the Atlantic coast at Burtonport, a total of 99 miles. The Carndonagh extension had closed in 1935, the Gweedore to Burtonport section in 1940, followed by the Letterkenny to Gweedore line in 1947. During the war the company's road services, which had been progressively developed since 1929 as the roads were improved, were much reduced and the railway reinstated daily passenger services to Buncrana and even carried passengers on the goods trains to Gweedore. Regular passenger services ceased in late 1948 as buses became more plentiful, but excursions to Buncrana on holiday weekends continued until 1951, though we were not destined to see them.

Our journey from Belfast was a new and interesting experience. Ballymoney produced a yard full of Ballycastle Railway rolling stock stored following the closure a year earlier, and every locomotive seen was new to me. From Londonderry Waterside station we crossed the Craigavon Bridge to the Swilly bus station for the bus to Buncrana, our destination and home for a week. As we trundled out of the town along Strand Road, Graving Dock station was easily recognised and I had the feeling that we were now in business. We passed over the level crossing at Pennyburn, slowed and turned left, and there it all was—the offices, workshops, loco shed with four locomotives standing about and masses of goods and passenger stock. That great feeling of excitement at having made it after eleven years just could not be suppressed, and tomorrow I would be among it all.

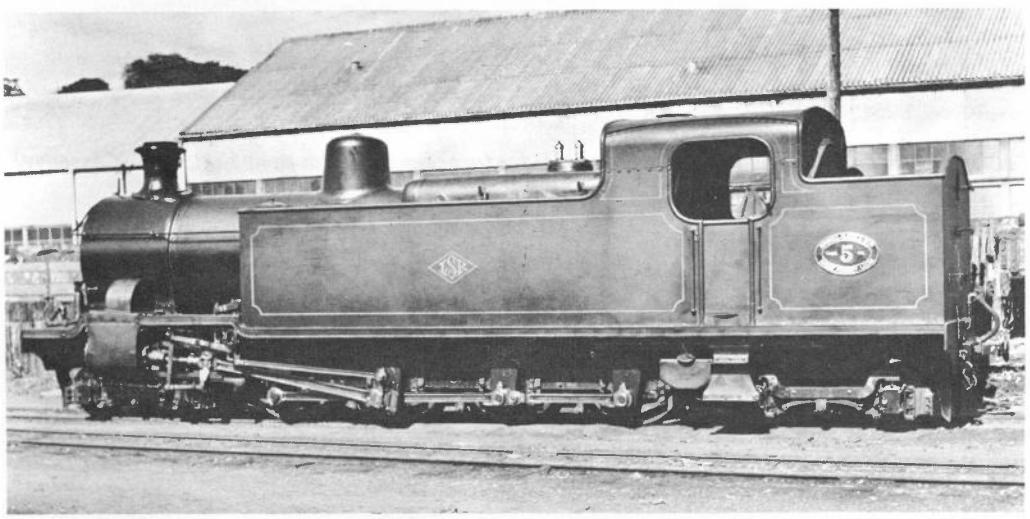
The following day I returned, armed with a letter from Mr. James. J.W. Whyte, the Secretary and Manager, inviting me to inspect their drawings whenever I was in the vicinity. I was given royal treatment for the whole afternoon. The drawings of the famous 4-8-4 tank were pored over at length, and sufficient information obtained for me to produce my own drawing* after returning home, while useful notes were taken of the Hawthorn Leslie

**This drawing was published in "The Narrow Gauge" No.38 (May 1965).*

The Lough Swilly station at Letterkenny, with No.2 waiting to leave on the daily goods train to Londonderry in May 1950. *(W.A. Camwell)*



Pennyburn shed, May 1952: Barclay 4-6-0 tanks No.2 (left) and No.3 (right) flank Hudswell Clarke 4-6-2T No. 15 *(W.A. Camwell)*



Hudswell Clarke No.5 in Pennyburn shed yard after being specially cleaned for this picture in May 1950. *(R.C. Riley)*

4-6-2 tanks. Letterkenny & Burtonport Extension Railway coach drawings were also produced, but no 3ft gauge Swilly coaches. The only Swilly coach drawings I did see were the original 5ft 3in gauge six-wheelers which in one sense were perhaps more interesting. I wonder if they still survive. The only disappointment concerned some drawings of goods vehicles which had been dug out for me by the office boy. By chance he happened to be on holiday at the time of my visit, and no-one else could discover where he had put them.

Much time was spent in and around the works and loco shed. I noted 4-6-0 tanks 2 and 3, and 4-6-2 tanks 8 and 10 available for service, but 4-6-0 tank 4, and 4-6-2 tank 16 were partly dismantled and obviously never to be used again. Another 4-6-2 tank, 15, was only lacking in chimney and stood in the works entrance after a major overhaul. It later went back into service and did a lot of work before the line finally closed. The famous 4-8-4 tanks which had drawn me to Londonderry were unfortunately out of use. No.5 lay in lovely condition in the shed, and 6, straight from complete overhaul, in the lean-to. No.6 never was steamed again, and was only brought out in 1954 to be cut up for scrap.

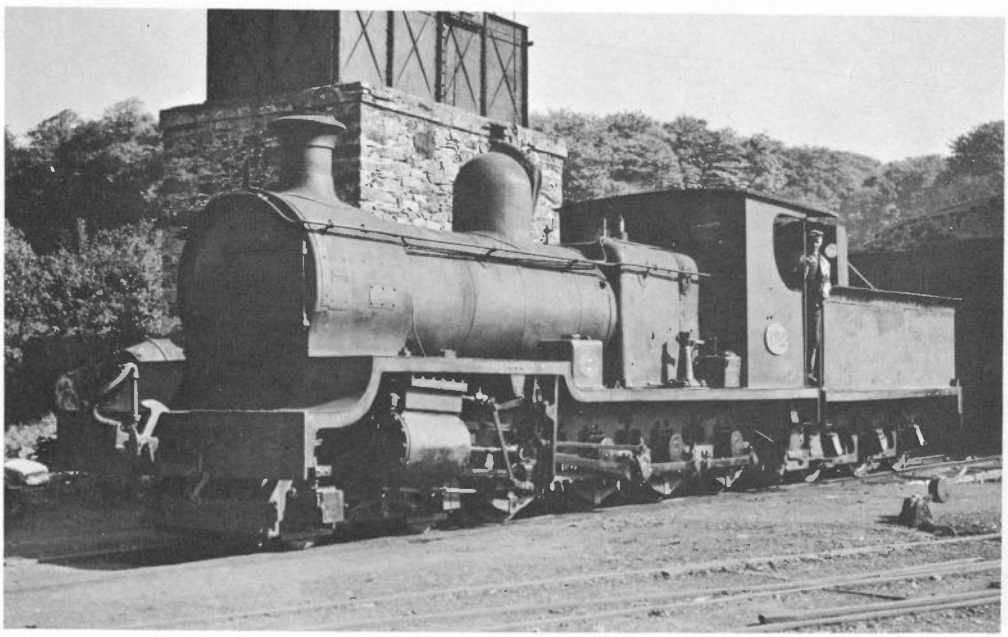
A quiet interlude at Buncrana as No. 10 waits to leave for Londonderry in April 1948. (H.C. Casserley)

Heavy goods traffic at Buncrana: A view of the busy station and goods yard in August 1951. (P.S. Halton)

After a good browse round I was given the choice of the bus or goods train for my return journey to Buncrana. Because of the time I chose the bus and it did not help one bit when on my return to the "Lake of Shadows" hotel my wife told me that it wouldn't have mattered if I had been late. For me it was too late, my chance to ride the Swilly was gone—for ever.

The following day we crossed the water from Fahan to Rathmullen, then took the bus to Letterkenny. We had ample time to look round. The unique 4-8-0 tender locomotive was deep in the shed and could not be photographed, but we did see the afternoon goods train arrive behind 4-6-0 tank No.3 before our bus left on its return journey. There was no bus connection for Buncrana at Bridge End so we had to return the way we had come and catch the boat, or be stranded for the night. On the next two days we took the role of tourists, but twice a day, at 2.30 and 4.40 each afternoon the railway called as goods trains arrived at the grass-grown though well filled station. The first train was the 1.15p.m. goods train from Derry, the later one a connection at Tooban Junction with the 2.15p.m. from Letterkenny and the 2.30p.m. from Derry, and was not quite so heavily loaded. On the two days that I saw these trains I should think that they brought in about 15-20 wagons. This compared with 20-25 on the afternoon arrival in Letterkenny, and its corresponding arrival in Derry. I found this quite encouraging considering the general state of the Swilly rail system and its uncertain future. At every station there was a most definate feeling of vigour and life as shunting operations proceeded, and every train had a brake-composite coach bring up the rear. It seemed quite obvious that any train lacking such a vehicle would not be a properly constituted train. Even so the only occupant usually turned out to be the guard, although there was just one passenger on the afternoon arrival in Derry during my visit to Pennyburn.

The Buncrana engine was the 4-6-2 tank No.10 built by Kerr Stuart in 1904. It was kept in superb condition and occupied a small shed at Fahan. This seemed something of an apology for a loco depot, but of course Fahan had once been an important station, and it was much better than leaving a loco out in the open at Buncrana. When this was a through station there was no need for a loco depot, and after it became the terminus in 1935 it would have been far too costly to build one. All the same I felt that such a handsome, well kept locomotive sneaking into this small shed almost on the waters edge was not quite as it should be.



On one of the rare occasions when it was pulled out of the shed, 4-8-0 No.12 stands in the sunshine at Letterkenny in May 1950. *(W.A. Camwell)*

One thing I did feel, though, throughout the whole system was that here was a line with a powerful aura all its own. There was the slow, leisurely progress so typical of the narrow gauge—especially in Ireland—with all its visual and audible impressions, but at the same time it suggested something big. Here was a railway which, in spite of being within two years of complete closure, suggested that it could still do a big job if called upon to do so. There was really no impression of throwing in the towel—the line was still in business and was going to carry on doing what it had always done until overtaken by final closure. Indeed, Lough Swilly lorries were rarely seen on the roads although their day was fast approaching. This feeling pervaded the empty platforms of Buncrana. They were long and wide, and apart from the lack of cover as large as any on the broad gauge. The long excursion trains could easily be pictured as they brought nearly a third of the total population of Buncrana in one load. And what of the services operated during the last war....surely, this **is** Ireland.

A gentleman who lived in Buncrana and had a plumbing business in Derry told us of the time he had a job to do at home. All his materials were at his yard in Derry and taking copper tube across the border was not permitted. But the job had to be done, and so it happened that one dark night a train stopped at Bridge End and the Customs officers descended upon it as usual. "What are those pipes under the seat?" "What pipes?" enquired the plumber. "Those under the seat" replied the Customs officer. Our story teller bent slowly forward and peered into the gloom under the seat: "Oh, those pipes! They've fitted steam heating instead of the old foot-warmers". "Oh, alright" said the officer, and moved on down the train.

The week passed all too quickly and on the 20th of August we left Buncrana for Killybegs and the County Donegal Railway. However, the Swilly had one last surprise. We returned on the bus to Derry, and in Pennyburn yard stood the 4-8-4 tank No.5, resplendant and spotlessly clean. I dashed off the bus, into the yard and requested permission to photograph the loco. A junior clerk accompanied me, and when I asked why the locomotive had been brought out and cleaned he said that he didn't know, but after my earlier visit Mr. Whyte had told the staff to get No.5 out of the shed and clean it. I shall always believe that this was done because of my disappointment earlier in the week, it was the sort of thing railways such as the Swilly did; and it is why I have so much affection for the threadbare and weary narrow gauge that made my holiday all those years ago.

A load of sleepers hauled by Hudswell Clarke No.8, pauses at Newtown Cunningham on its way from Derry to Letterkenny in May 1952. *(W.A. Camwell)*

The timelessness of the Lough Swilly Railway is well portrayed in these scenes of the approach to Pennyburn yard. On the 7th July 1937 Hawthorn Leslie 4-6-2T 14 arrives in early afternoon with the 8.30 a.m. passenger train from Burtonport, 74 miles away on the west coast. The light grey carriage on the right (18) is a six-wheeler dating from 1885. Note the vents and pipes to the acetylene lights. *(E.W. Hannan)*

At the same location in May 1950, Hudswell Clarke 4-6-2T 15 is arriving with a goods train. Carriage B12 on the right, a bogie 1st/3rd built for the Letterkenny & Burtonport Extension Railway in 1904, had by then lost its acetylene lighting and this, together with a reduction of the weeds on the track, are the only significant changes in thirteen years. *(R.C. Riley)*

COTSWOLD WILD LIFE PARK RAILWAY

Keith Fenwick

In the beautiful country town of Burford, on the fringe of the Cotswolds mid-way between Swindon and Cheltenham is the Cotswold Wild Life Park. This is a relatively recent development and, like many similar parks in other parts of the country, is served by a 2ft gauge railway. The Cotswold Wild Life Park Railway was constructed during the spring of 1974, and services commenced over part of the route in July of that year. Eventually the track was extended to nearly a mile in length with loops at either end, and the whole line was officially opened in April 1975. Passenger services were operated by 20 hp Ruston Hornsby diesel locomotives fitted with steam outline bodies, hauling enclosed wooden bogie coaches fitted with longitudinal seats.

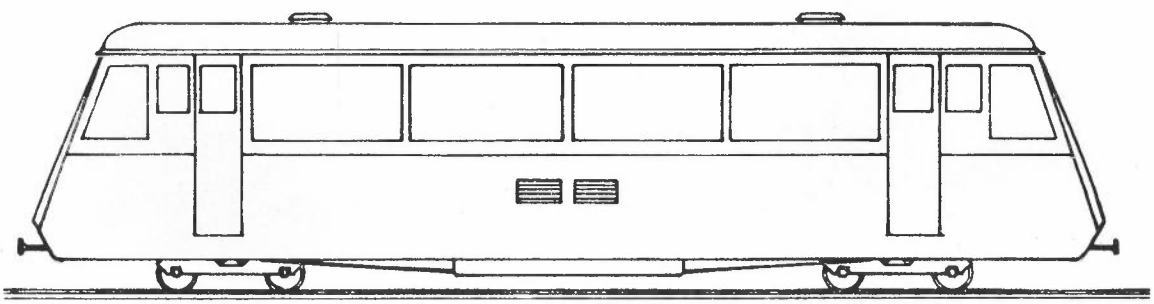
This equipment served the railway well during the first years of operation, but traffic soon developed to such a level that more powerful locomotives, and additional carriages became necessary. A Motor Rail locomotive was placed in service and although not modified in any way it proved superior to the Rustons. Two similar locomotives which had been in service with the Anglian Water Authority were obtained, and moved to Stratford-upon-Avon for rebuilding. New steam outline bodies, loosely following the outline of the Great Western Railway pannier tank design, were fitted, the first rebuild (MR 9978/1954) entering service last summer, closely followed by the second (MR 9869/1953). The original Motor Rail (9976/1954) was returned to the works for rebuilding during the winter and should be complete in time for the summer.

A programme to replace all the original wooden carriage stock was also put in hand last year. These new vehicles are of similar design but have metal bodies, with seat down either side, and end balconies. They are not yet glazed but windows will be fitted in the future. All the carriages carry the names of animals in well-known stories. Six are now in service, made up in trains of either two or three to suit traffic requirements.

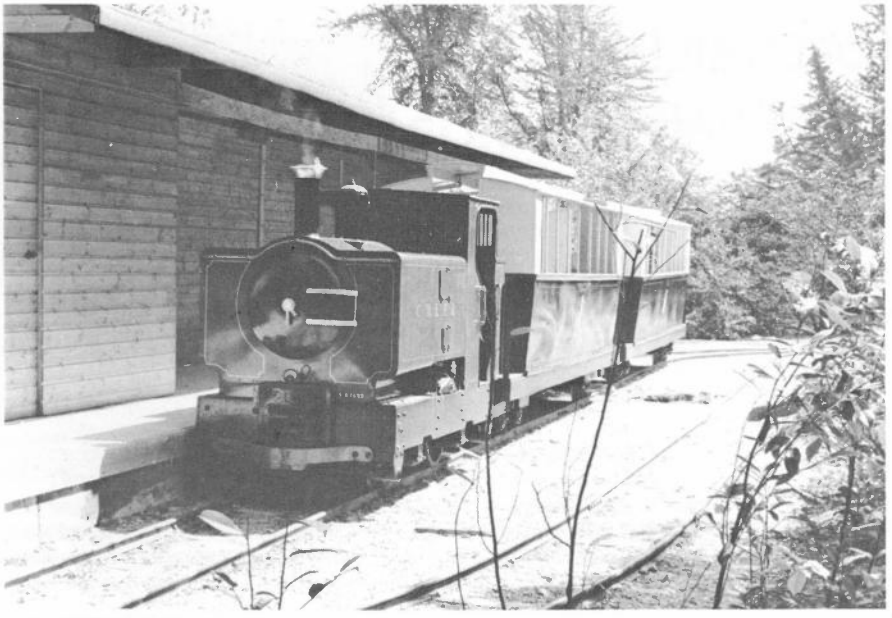
The original "Jubilee" track is being replaced by 20 lb/yd rail fixed to wooden sleepers with coachscrews and clips, and by the end of this year all the track should be in the new material. A rather handsome new station building was erected last year, and a new locomotive shed will be provided this summer, together with extra sidings accessible through a three-way point.

In addition to all these improvements, Leisuretrack is constructing a completely new railcar at the Timothy's Bridge Road works in Stratford-upon-Avon. This is fully enclosed and seats 24 passengers. A two-cylinder air cooled Lister diesel engine drives the wheels through a Vickers hydraulic transmission system, and the railcar can be controlled from a cab at each end. It will be delivered to Burford in May, ready for traffic in the main summer season.

The railway is now very much part of the Wild Life Park, and carries around 50,000 passengers each year. Although the railway is now operated entirely separately from the main business, Leisuretrack continues to undertake all building and new works on the railway. The maintenance area is fenced off from the track but may be visited by those interested by prior appointment.



Sketch of the new 24 seat diesel-hydraulic railcar. The body is 28ft long, 7ft high from rail level and 5ft wide. *(Leisuretrack)*

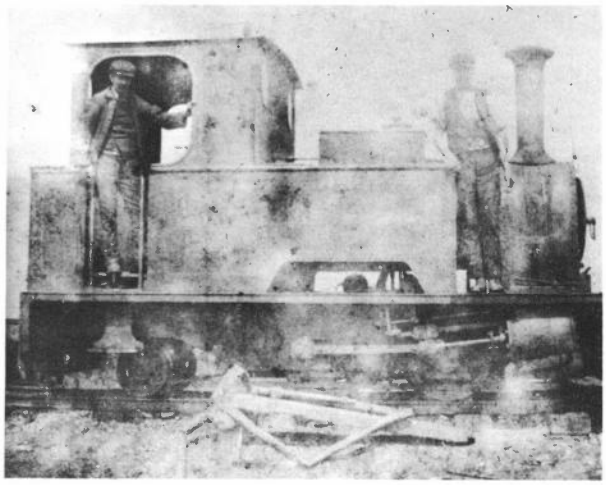


The new station building on the CWLPR, with MR 9978 and a two coach train at the platform. *(Leisuretrack)*

The two rebuilt Motor Rail locomotives. ADAM MR 9978/1954 on the left and OLIVER, MR 9869/1953 on the right. *(Leisuretrack)*

FROM DEERHILL TO WESSENDEN HEAD

W. Sykes



One of the Kerr Stuart 0-4-2T locomotives, either 741/1900 or 757/1901. Both were purchased by R C Crawford from Abram Kellett, Hayfield in 1908 after working on the Stockport Corporation Kinder contract.
(W. Sykes)

Contractors railways have always had a special appeal, and those laid across the Pennine moors in connection with reservoir construction were among the most fascinating. To a narrow gauge railway enthusiast living in this area the period before the 1914-18 War offered many opportunities to experience these operations at first hand.

One of the earliest schemes to use 3ft gauge steam locomotives was the construction of Deerhill and Blackmoorfoot reservoirs by the Huddersfield Corporation Waterworks Commissioners during 1870-74. Water was conveyed from the gathering grounds to these reservoirs by two catchwater channels constructed along the contours of the hills, and in 1908 the Corporation placed a contract with R C Crawford of Uddingston to reconstruct the catchwater from near Wessenden Head to Deerhill reservoir.

A small contractors village of huts and workshops was constructed to the west of Deerhill reservoir, close to the 1000ft contour. To supply this a 2ft 9in gauge railway was laid for about ½ mile from the old Manchester road near Marsden, just beyond the present Woods Avenue. Machinery and materials were brought by road to the railway, then hauled up the steep gradient to the camp. The number of wagons on each trip was strictly limited. From the workshops the track ran mostly along the bank of the catchwater, climbing to 1250ft in 2½ miles. The gradient was fairly easy and trains of up to fourteen low, drop-side trucks would be hauled by one of the contractors 0-4-2 tank engines. I found that photographs given to the driver and fireman were the equivalent of a "season ticket" when I wanted a ride, and the railway was certainly very thrilled to travel over because of its location high above the valley, sharp curves and uneven track. It even beat my experience of the Festiniog or Vale of Rheidol railways.

R C Crawford went bankrupt in 1911, and his plant lying at Marsden was offered at auction. The following notice appeared in *The Contract Journal,* 27th September 1911:

"IMPORTANT UNRESERVED SALE OF CONTRACTORS' PLANT
A. T. AND E.A. CROW, Auctioneers, Sunderland, have been instructed by Gilbert Norton, Esq., Trustee (Armitage and Norton, Accountants,, Huddersfield), to SELL by AUCTION, on WEDNESDAY, 11th October, 1911 the whole of the valuable PLANT AND MACHINERY comprising two splendid loco. tank engines, 4 wheels coupled and trail wheels, 7½in cyls. 12in stroke, 2ft 9in gauge, by Kerr, Stewart and Co., Stoke-on-Trent; coffee pot locomotive BARTON 7½in vertical cyls. 11in stroke, 2ft 9in gauge; 10 hp traction engine and crane combined with rising and falling jib, by Aveling and Porter; two 8 hp traction engines, by Fowler; two 10 ton traction wagons, on springs; one 8 ton ditto, not on springs; two 30 cwt. derrick cranes, by Watson and Son; disintegrator and sand maker, Christy and Norris' patent; Baxter's patent granulator, 12in by 3in; Baxter's improved patent knapping motion stone breaker, 16in by 9in, mounted on wheels, and with screening apparatus; 13in by 8in stone breaker on road wheels, by Thomas and Forster; diaphragm, centrifugal and other pumps; pillar drilling machine 1¼in spindle; about 200 1 cub yd side-tip wagons 2ft 9in gauge; about 100 navvy and other barrows; rails, wheels, piping, shovels, W. and C iron tools, contents of stores, &c., &c."

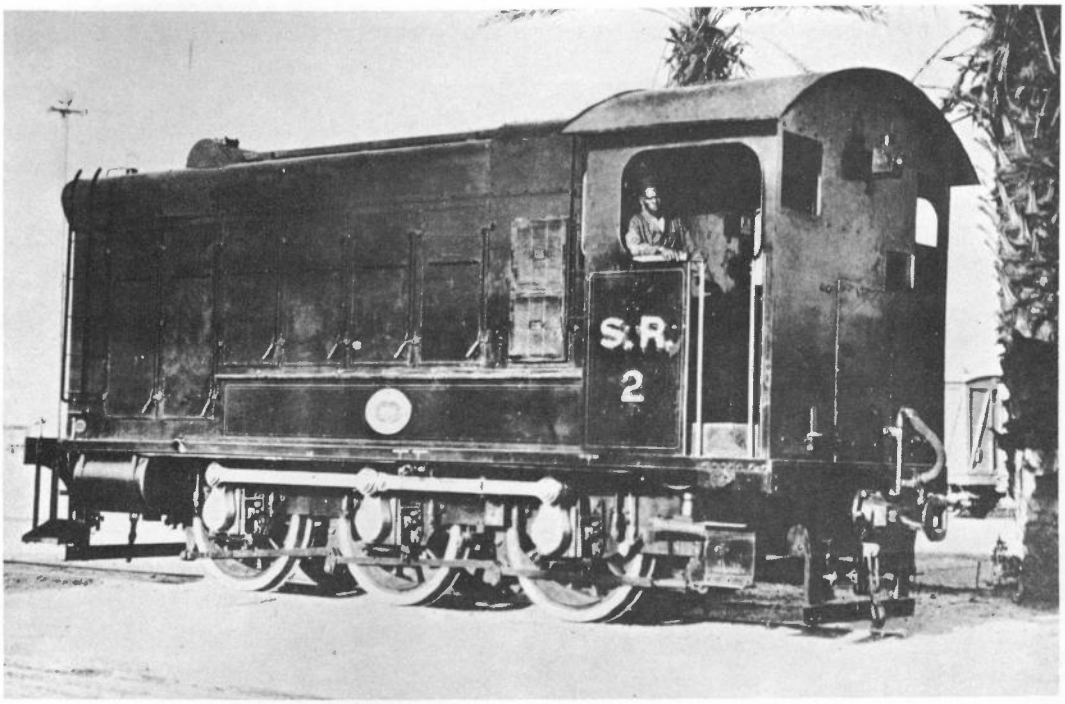
(This article is based on a description of the railway by the late W. Sykes in "Between the Lines", magazine of the Huddersfield Railway Circle, Vol. 3 No 16, October 1957. The photograph was loaned by Mrs E Noble, Mr Sykes' daughter. Harold D. Bowtell, author of "Reservoir Railways of the Yorkshire Pennines" published by Oakwood Press, 1979 provided additional historical information and Andrew Neale the advertisement from "The Contract Journal")

THE BRITISH NARROW GAUGE INTERNAL COMBUSTION LOCOMOTIVE PART 12: ENGLISH ELECTRIC SHUNTERS

Brian Webb

The British Railways standard 350/400 h.p. six coupled diesel electric shunting locomotive originated in 1934, and, together with the many examples built for export, eventually formed one of the worlds largest locomotive classes when construction ceased in 1962. Excluding those built by the main line railways in their own workshops, a total of 177 were supplied by The English Electric Co. Ltd. themselves. Of these only 19 were for use in this country, and only 30 were for rail gauges less than 4ft 8 ½ in. It is this small minority which interests us here.

The first 17 locomotives of the type were built in association with R. & W. Hawthorn, Leslie & Co. Ltd. of Newcastle-upon-Tyne during the period from 1934 to 1936. Hawthorn, Leslie had been working with English Electric for some years on a few small orders for electric locomotives, but the reason for this is not clear because the English Electric shops at the former Dick Kerr works at Preston were available, and apparently not too busy during the 1930's slump to do the work themselves. Nevertheless the complete mechanical portions of these



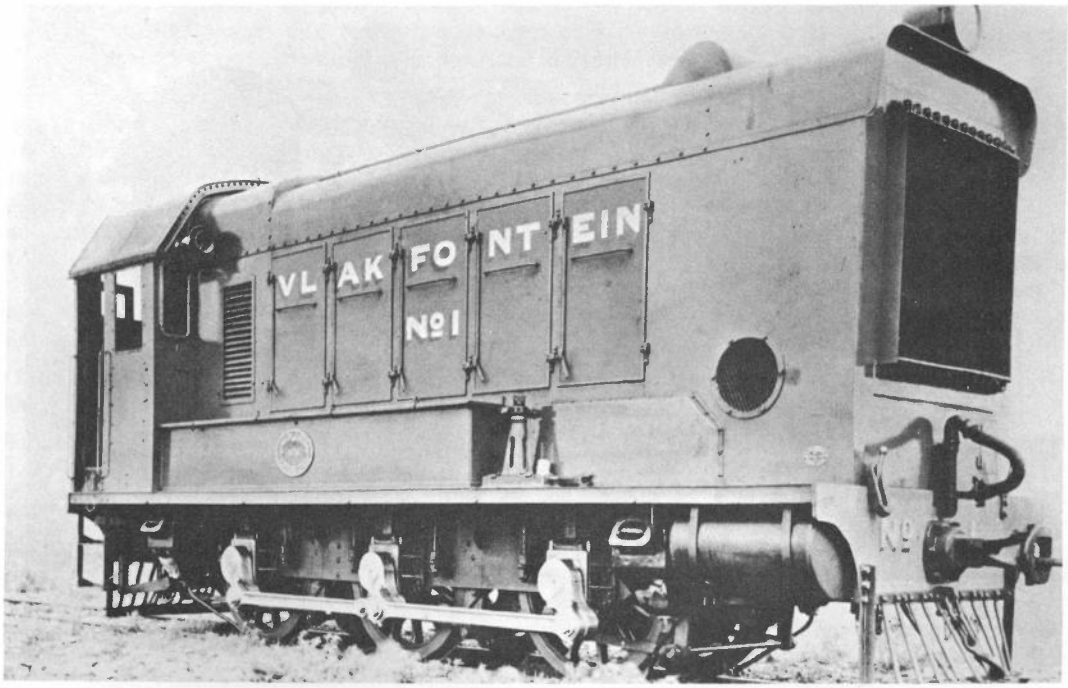
Sudan Government Railways 2 (HL 3855/1935) is not only very similar in appearance to the standard 350/400 h.p. diesel electric locomotives, but also betrays its steam predecessors in the cab design and spoked wheels with balance weights.

(GEC Traction Ltd. Collection of B. Webb)

locomotives were built at Forth Banks works, Newcastle, and then taken to Preston for the installation of traction equipment. Photographs showing completed locomotives leaving Preston by road transport usually carry large placards proclaiming "Built by The English Electric Co. Ltd., Preston" in spite of the fact that they clearly carry the real identity of the builder on their works plates!

Hawthorn Leslie/English Electric built five 3ft 6in 0-6-0 diesel electric locomotives in 1935/36. Two were despatched in August 1935 to the Sudan Government Railways as their numbers 1 and 2, and three were despatched in May 1936 to New Consolidated Goldfields Ltd., South Africa. Of very similar appearance to others of the type, all are believed to be still at work. In 1948 the Preston works supplied twenty metre gauge examples to the Federated Malay States Railway, their numbers 151.01-20. These were designated the tropical variation and had additional radiator capacity and cooling equipment. A rear mounted fuel tank reminiscent of a steam locomotive coal bunker was also fitted. These changes were only a modification from the standard and were not therefore considered a separate design. Finally, in 1951, Preston supplied a repeat order of five locomotives to the Sudan, incorporating the tropical variations outlined above.

With the exception of the three New Consolidated Goldfields locomotives, all the English Electric six coupled locomotives were fitted with the very robust and conservatively rated English Electric type 6K six-cylinder vertical diesel engine giving 300, 350 or 400 b.h.p. as required. This pioneer of all current English Electric type rail traction diesel engines originated from the Willans engine division of the English Electric amalgamation. It is available today in the 1050-1320 b.h.p. range of Mark III engines from G.E.C. Diesels Ltd., a good example of how their excellence has been developed. The Goldfields locomotives had the unique, at least so far as rail traction is concerned, seven-cylinder 7KT engine developing 410 b.h.p.

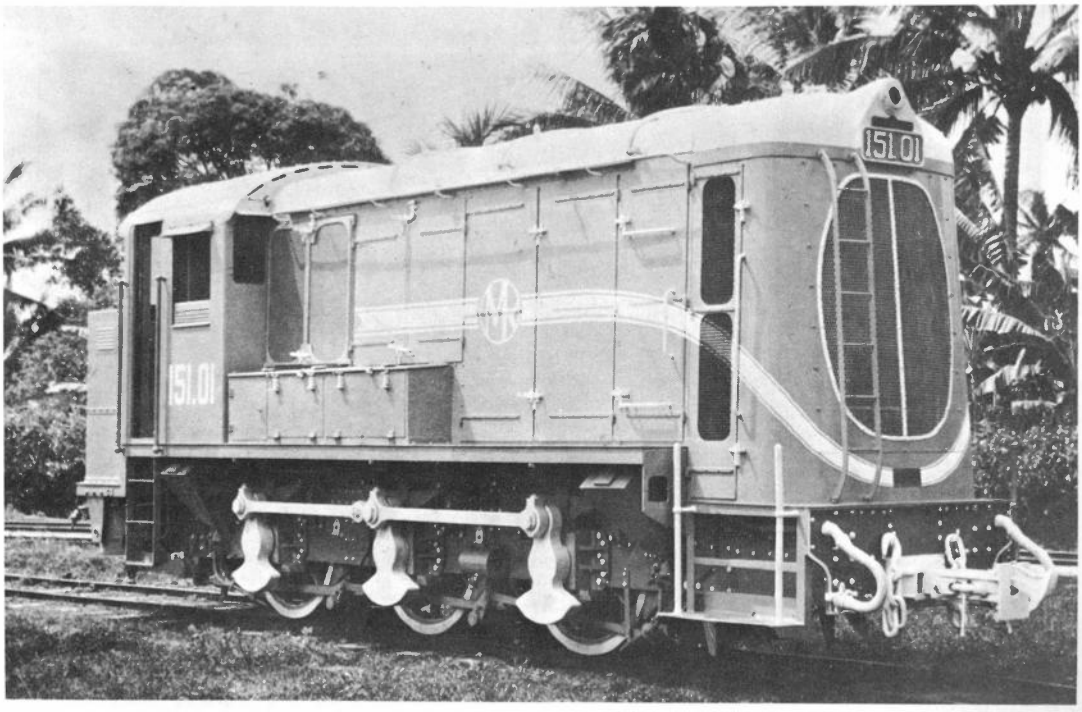


VLAKFONTEIN No. 1 (HL3866/1935) also had the severe lines of the early English Electric diesel shunters. *(GEC Traction Ltd. Collection of B. Webb)*

The main dimensions and details of these narrow gauge locomotives are listed below:

		Sudan 1 & 2	*Goldfields 1 - 3*	*F.M.S.R. 151.01-20*	*Sudan 403-407*
Contract No.	:	6E100	6E0151	6S0532	6X0674
Contract date	:	19/3/35	9/35	8/45	28/2/49
Works number	:	HL 3854/5	HL 3866-8	EE 1485-1504	EE 1764-8
Delivery date	:	8/35	5/36	6/48	7/51
Engine type	:	6K	7KT	6KT	6KT
Engine rating: b.h.p./r.p.m.	:	350/675	410/695	350/680	400/680
Generator type	:	EC 322/10	EC 322/10	801/4C	801/7C
Traction motor type	:	DK86/2C	DK86/2C	508/ A	508 A
Gear ratio	:	75:16	75:16	79:16	
Length over couplers	:	28ft 10¼ in	—	—	
Length over buffers	:	—	29ft 1¼ in	31ft 1¾ in	
Overall width	:	9ft	9ft	9ft 2½ in	
Overall height	:	12ft 9in	13ft 0½ in	11ft 9½ in	
Wheelbase	:	11ft 6in	11ft 9in	11ft 6in	
Wheel diameter	:	4ft 3in	4ft 3in	4ft	
Weight in working order	:	45.75 tons	47 tons	47 tons	
Max. axle load	:	15.5 tons	16 tons	15.7 tons	
Fuel capacity	:	150 galls	150 galls	150 galls	
Max. tractive effort	:	29000 lb	29000 lb	33000 lb	
Max. speed	:	40 m.p.h.	40 m.p.h.	35 m.p.h	

Note: The Sudan locomotives 1 and 2 were ordered as mixed traffic locomotives. Details of the 1951 batch of Sudan locomotives have not been finally ascertained but are probably the same as the F.M.S.R. type.



The Malayan Railway had a tradition of handsome and spotless locomotives, and 151.01 was certainly treated to some special styling. It emerged from English Electric with this rounded bonnet, shaped fly-cranks and a very elaborate livery which included picking out all the bolts in the frames. *(GEC Traction Ltd. Collection of B. Webb)*

THE PARIS EXHIBITION OF 1878

R. Martin

Following the Great Exhibition of 1851, which gave Britain a grand display of her technological achievements, other nations followed suit and in 1878 it was again the turn of France to show her wares to the world. Narrow gauge railways were of course part of the latest technology in the 1870's, and featured prominently both before and during the Exhibition.

The Exhibition site lay between the Ecole Militaire and the River Seine, in the area now occupied by the Park du Champs de Mars and the Eiffel Tower. A small section was on the opposite bank of the river but most of the engineering equipment was on the former site which was connected by rail to the Gare du Champs de Mars. The Machinery Hall was 705m long and 350m wide, about half of this being devoted to France, and the remainder to other European countries and America. Britain had a large section.

The technical press of the day reported in detail on the progress in constructing the halls, and later, installing exhibits with the aid of the latest equipment:

> "Systems of light, portable, narrow gauge tramways, with special trucks, have within two years sprung into general use in France, on farms and plantations, and in factories, and one of them has already made its appearance at the Exhibition. Pairs of light rails about 9ft long are

A typical Decauville advertisement which appeared in January, 1879. The scene purports to illustrate a railway used to transport sugar cane at Bourbon. Can any reader say where this might be?

(Authors collection)

BLACK, HAWTHORN, & CO.,

LOCOMOTIVE, MARINE, AND STATIONARY ENGINE WORKS

GATESHEAD-ON-TYNE,

MANUFACTURERS OF

TANK LOCOMOTIVES all Sizes.

Adapted to any gauge, from the narrowest to the broadest, as well as sharp curves and heavy gradients; weight equally distributed on wheels; greatest effective power with minimum cost of maintenance. The general arrangement and details most carefully studied, and designed from an extensive experience in the manufacture of these Engines. Material and workmanship of the highest class in Locomotive practice.

BLACK, HAWTHORN, & Co. have supplied these Engines to the principal Main Lines, Short Lines, Collieries, Manufactories, Blast Furnaces, Ship Yards, Dock Yards, Stone and Limestone Quarries, Gasworks, &c., throughout the United Kingdom; also to the British Government in India, the New Zealand, Nova Scotian, and Egyptian State Railways; and for Canada, Norway, Sweden, Spain, Portugal, Peru, the Brazils, &c. &c.

BLACK, HAWTHORN, & Co. have specially designed Small Engines for Sugar Plantations and other Colonial purposes, weighing in working order from three tons upwards, and adapted to light rails. One of this type, the "Mignonne," exhibited at the Paris Exhibition, 1878, now exhibiting in the MACHINERY DEPARTMENT OF THE SOUTH KENSINGTON MUSEUM, by request of the Authorities.

Standard four wheels coupled Engines, from 9 to 13 inches diameter in cylinders; also 14 inch cylinders and upwards, six wheels coupled, adapted to 4 feet 8½ inch gauge, always in progress, and may be had at short notice.

All Engines constructed to Whitworth's Standard Gauges. Duplicate parts always on hand. Prices, Photographs, and Specifications forwarded on application.

LOCOMOTIVE ENGINES AND TENDERS.

CRANE LOCOMOTIVES, to lift from 1 to 10 Tons, with Turning and Lifting Motions.

AWARDED SILVER MEDAL, PARIS EXHIBITION, 1878.

THE HIGHEST PRIZE FOR TANK LOCOMOTIVES.

2107

An advertisement from "Engineering", 11th July 1879, records the award to Black, Hawthorn & Co. at the Paris Exhibition. *(by permission of the Editor of "Engineering")*

> joined by three or four light cross pieces such that they are about 15in (actually 400mm = 15¾ in) apart. The ends are formed to catch one in the other; a man passes his head through one of these sections, lowers it down, and easily joins it to one already laid. The sections are made curved as well as straight. There are at least four makers in the field, but the only system we are acquainted with is that of M. Decauville, the great farmer of Petit-Bourg near Ivry, who obtained a prize for it at a meeting of the Royal Irish Agricultural Society at Galway last year. Time was when England was foremost in arrangements for the saving of labour and the application of science to industry, now France seems to be going ahead of us in this and other matters."

Inevitably, as the opening date grew near the weather took a hand and the press reported:

> "The weather during the greater part of last week was as unfavourable as it could be, and the state of the ground was a sea of mud. But engineers and builders are not frightened by a little mud, and with the aid of railways within and without the machinery halls, the work is going on bravely. On the British side an Appleby traversing steam crane is constantly in action, and in the adjoining courts the packages are readily moved about on small, temporary railways. One line is laid along each of the three industrial courts, with a cross line at each of the doors. At each crossing one of the straight sections is shifted right or left an inch or two to throw the trucks onto another course. The trucks are flat, with strong tops, but with a tail about 6in deep at either end, which can be turned up or dropped down as required. The wheels are solid, flanged, and about 9in in diameter. We have often watched the men when using this handy rail, and recognised its great value in time-saving. With such aids and the energy of the workmen, we have no doubt that all will be ready in time".

And it was, although the opening ceremony on May 1st was almost washed out by heavy rain.

Locomotives naturally attracted great attention. There were nearly sixty in all, from France, Britain, Sweden, Austro-Hungary, Belgium, Switzerland and America, and narrow gauge locomotives were shown—probably for the first time. A British example was a type which will be familiar to most readers; a small 3ft gauge, four coupled, outside cylinder saddle tank built by Black, Hawthorn & Co., Gateshead. Named MIGNONNE, this carried works number 447, and was very similar to those delivered a little later to the Kettering Iron & Coal Co. It was one of eight supplied to Bolckow, Vaughan & Co., to work their 3ft gauge rail systems at Eston steel works, Middlesbrough, and Binchester coke ovens, near Bishop Auckland. The Eston works was relatively new, and these locomotives hauled hot steel blooms from the furnaces to the rail mill. At Binchester two locomotives were employed on charging the coke ovens.

TANK LOCOMOTIVE (3-FT. GAUGE), AT THE PARIS EXHIBITION.

CONSTRUCTED BY MESSRS. BLACK, HAWTHORN, AND CO., ENGINEERS, GATESHEAD-ON-TYNE.

Fig. 1.

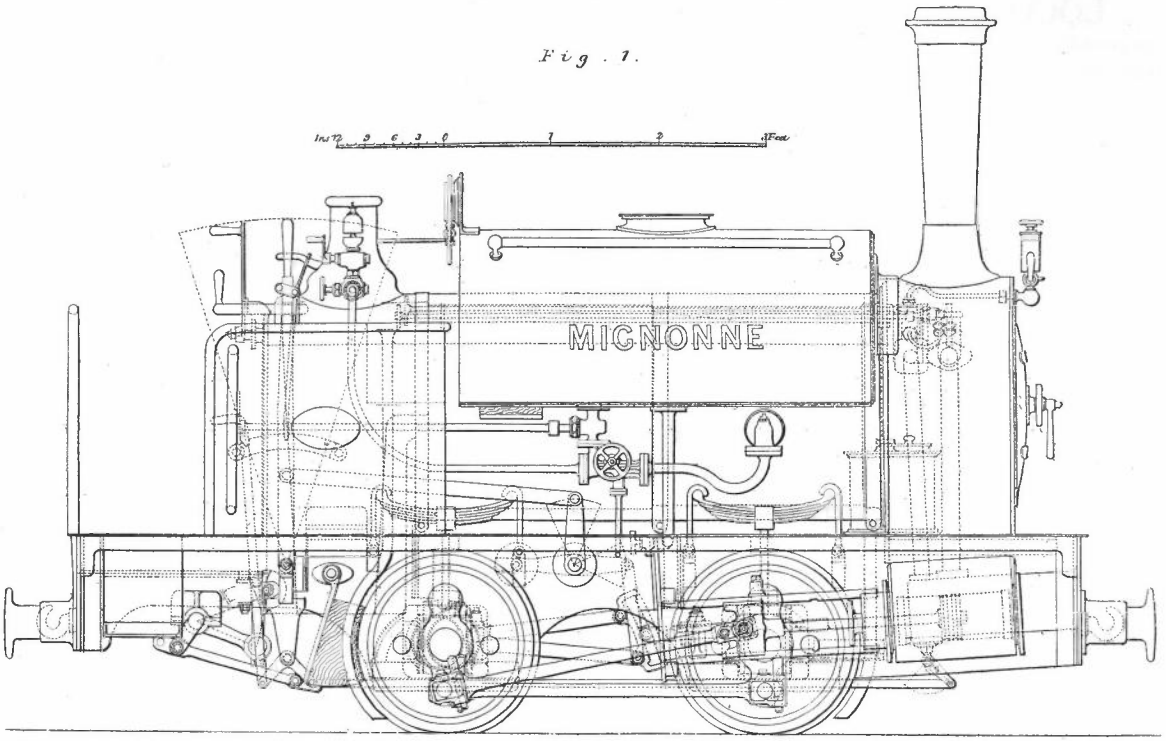
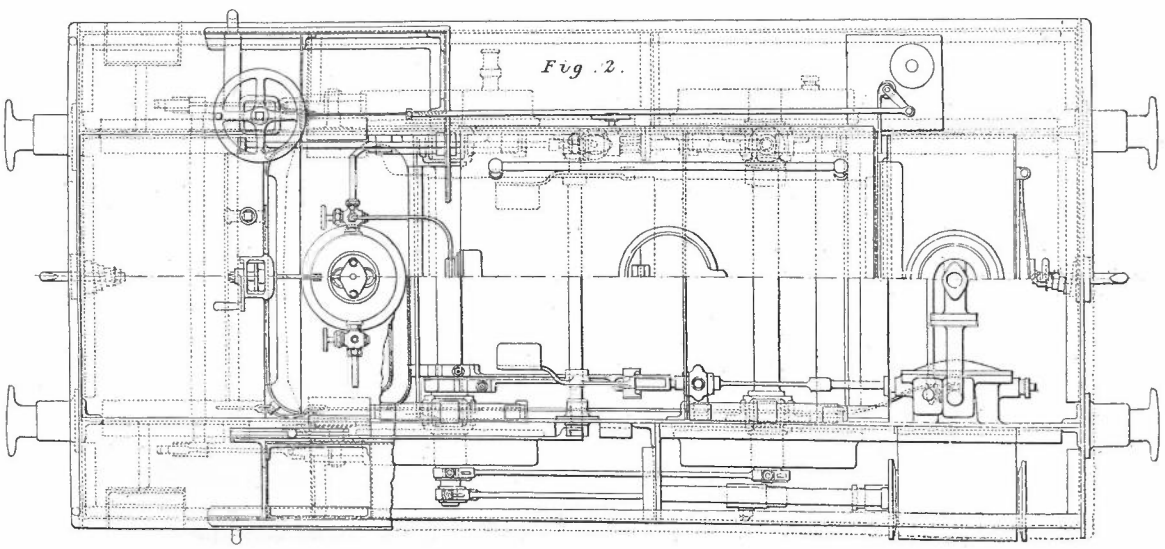
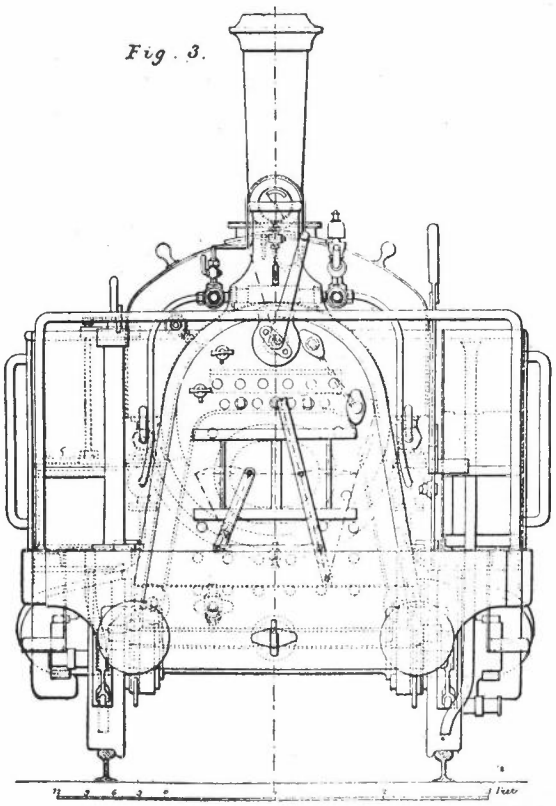


Fig. 2.



This superb engraving, reproduced from "Engineering" Vo. 25 (1878) by kind permission of the Editor, shows the simple and compact construction of the locomotive.

MIGNONNE was described as an admirable little engine, and its workmanship and finish a credit to the makers. It clearly impressed the adjudicators also, being awarded a Silver Medal in its class. The boiler shell was of Lowmoor iron, the firebox of copper and the 31—1½in tubes were brass. No dome was fitted, steam being collected by a perforated pipe running the length of the boiler to a slide valve regulator in the smokebox. Two spring loaded safety valves were fitted in a shaped housing on the firebox wrapper, and two injectors, one at either side underneath the saddle tank.



The principal dimensions were:

Cylinders	: 5in × 10in	
Coupled wheels	: 1ft 8in	
Wheelbase	: 3ft	
Boiler pressure	: 135 p.s.i.	
Coal capacity	: 4¼ cu.ft.	
Water capacity	: 50 gallons	
Weight in working order	: 3¼ tons	
Maximum load	: on the level	63 tons
Maximum load	: on 1 in 100	23 tons
Maximum load	: on 1 in 50	15 tons

Following the closure of the Exhibition MIGNONNE returned to England and was placed on display at the South Kensington Museum, as noted in the makers advertisements of the period. It remained here until 12th January 1880, when it was delivered to Eston. Surprisingly, its later history is not recorded, but we must presume that it had the rough, hard life which was usually the lot of steelworks locomotives. The 3ft gauge system was probably replaced during subsequent modernisation of the works, making the locomotives redundant.

Some of the other narrow gauge locomotives on show were certainly unconventional. The Société Suisse of Winterthur exhibited a 2ft 6in gauge 0-6-0 tank locomotive fitted with a swivelling crane on top of the firebox. The cylinders were mounted above the frames, so perhaps it drove the wheels indirectly through rocking levers. Decauville showed a peculiar 0-4-0 tank built for a metre gauge line by L. Corpet and Ch. Bourdon. Of antique appearance, this machine had a haycock firebox, and a tall, flared chimney. Two cylinders arranged in a V between the frames drove a single crank on the leading axle. Only one eccentric was provided to actuate the slide valves, but this could be turned on the axle by gears to reverse the engine. The tiny driving wheels (560mm—22in diameter) were coupled by side rods. A foot brake operated a shoe which bore down on the rail head, rather than on the wheels. So many unusual features were incorporated into this loco that it seems very unlikely that it could be successful in service. Maybe it was just another freak which was exhibited, then faded into obscurity.

In conclusion I would like to acknowledge contempory issues of *The Engineer* and *Engineering,* and 'The Locomotives of Black Hawthorn & Co.' by Allan C. Baker in *The Industrial Locomotive* Spring 1977, which provided the factual basis of this article.

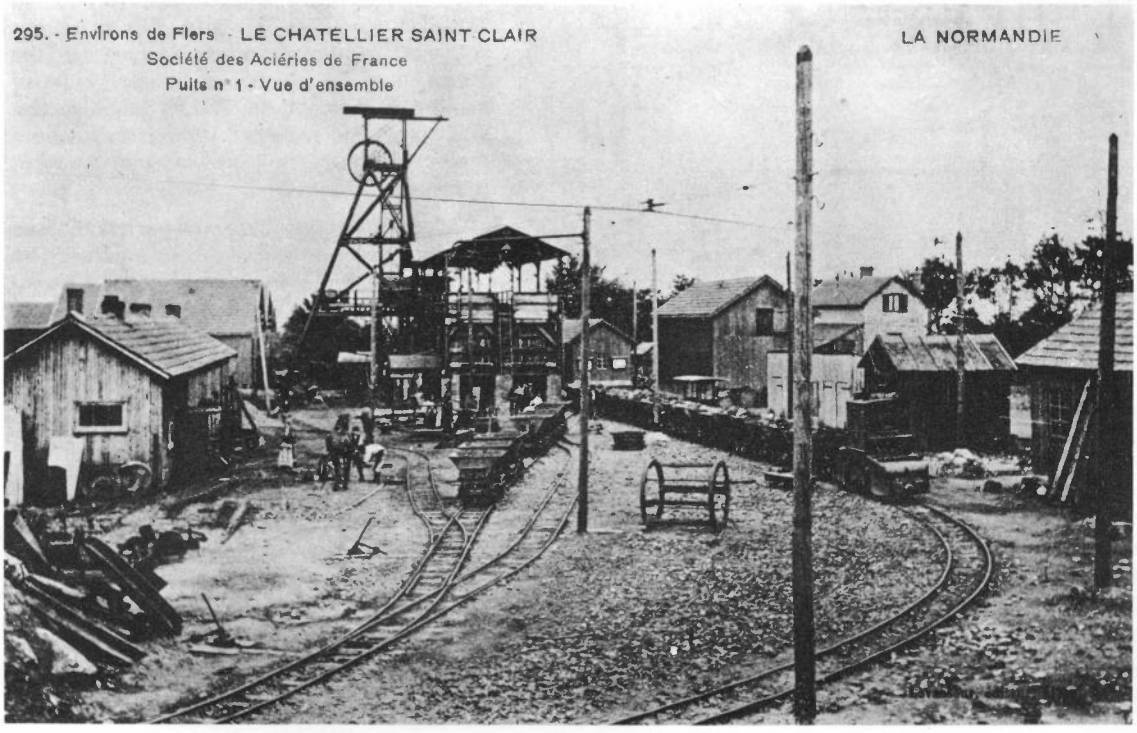
MINES DE FER DE HALOUZE

Pascal Pontremoli

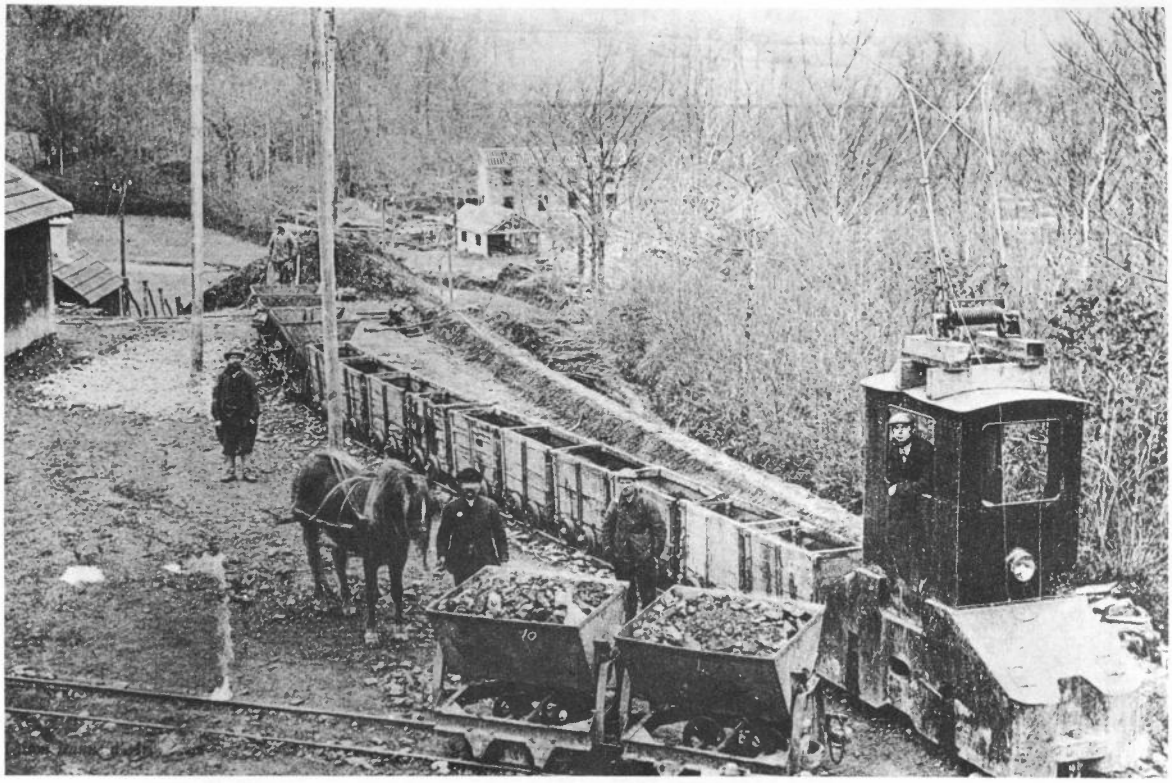
The extensive iron ore deposits of the Normandy province in Western France have been exploited by man since the iron age. Archeological remains have proved that these were surface worked by Romans during their occupation. Then, in the nineteenth century many deposits were worked by underground extraction, until one by one the deposits became exhausted and most of the mines closed. However, this iron ore is still being mined by a few companies, and one of the largest of these is the Compagnie des Forges de Chatillon-Commentry-Biache (CCB), an important mining and metallurgical concern, and successor to the Compagnie des Forges de Chatillon, Commentry et Nueves-Maisons (CCNM). The company operate the Mines de Halouze located in the 'Forêt de Halouze' which extends over an area bounded by the villages of St Clair de Halouze, La Chatellier, and La Chapelle Riche, some 7km south of Flers on route 524 between Vire and Argentan.

The Mines de Halouze still operate a private narrow gauge railway with electric traction between shaft No 1 bis and La Bocagerie, where the calcination plant is located. Rather unusually the gauge employed for this line is 760mm, making it unique in France. After calcination at La Bocagerie the ore is transported over a standard gauge line to the S.N.C.F. station at La Chatellier.

Extraction of ore at the Mines de Halouze began during the early years of this century, a concession for working the Forêt de Halouze deposits having been granted as early as 1884 to the mining company Société des Mines de Fer de Saint-Remy-sur-Orne (Calvados). In 1888 a decree united the Saint-Remy and Halouze concessions and these were conceded in 1900 to the Société Larzac Veiller. In 1905 the Société Anonymé des Aciéries de France took over the workings and started underground extraction. During 1905-06 the company constructed a 630mm gauge line 3.4km long between shafts 1 and 2, through La Bocagerie to the then Oueste



A general view of the Halouze mine showing the 630mm gauge layout. One of the Thomson-Houston locos stands on the right with a train of tip wagons. (collection P. Pontremoli)



An early scene on the 630mm gauge 'tramway' at the Halouze mines, showing a Thomson-Houston loco on a train of wooden bodied 'berlines'. The horse was used for shunting wagons at the mine. *(collection P. Pontremoli)*

station at La Chatellier and electrified it from the very beginning with direct current at 500 volts. The mine workings underground were provided with a 630mm gauge system electrified at 250 volts DC. The surface line was known locally as "the tramway".

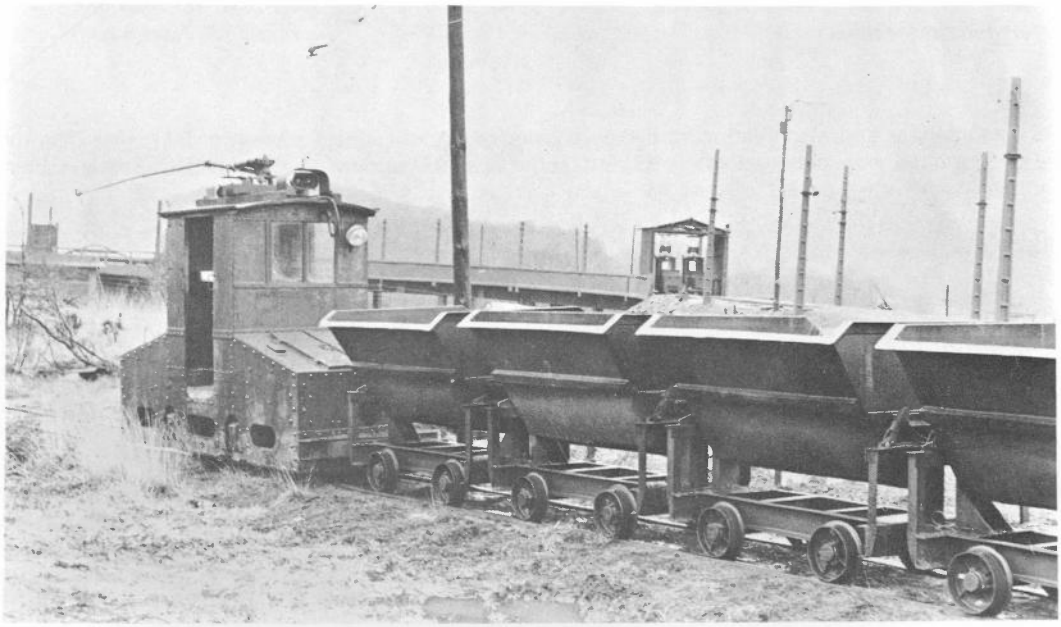
The S.A. des Aciéries de France operated the surface line with two primitive steeple cab locomotives built in 1906 by Ateliers Thomson-Houston (Ancien Etablissements Postel-Vinay, Paris), these being designated type MJ 6. They were powered by two 20hp traction motors and weighed 8 tons. Four other two axle steeple cab locomotives were subsequently purchased from Thomson-Houston and Forges et Ateliers de Constructions Eletriques de Jeumont, later supplemented by two four axle locomotives built by Westinghouse. Unfortunately no firm building dates for these are available.

During 1939 a small Vetra steeple cab locomotive was delivered, and a further similar example was acquired during the early 1950's. The latter locomotive was used exclusively on the coal service at La Bocagerie. Current collection on the early locos was by bow collector whilst the newer ones were equipped with trolley poles.

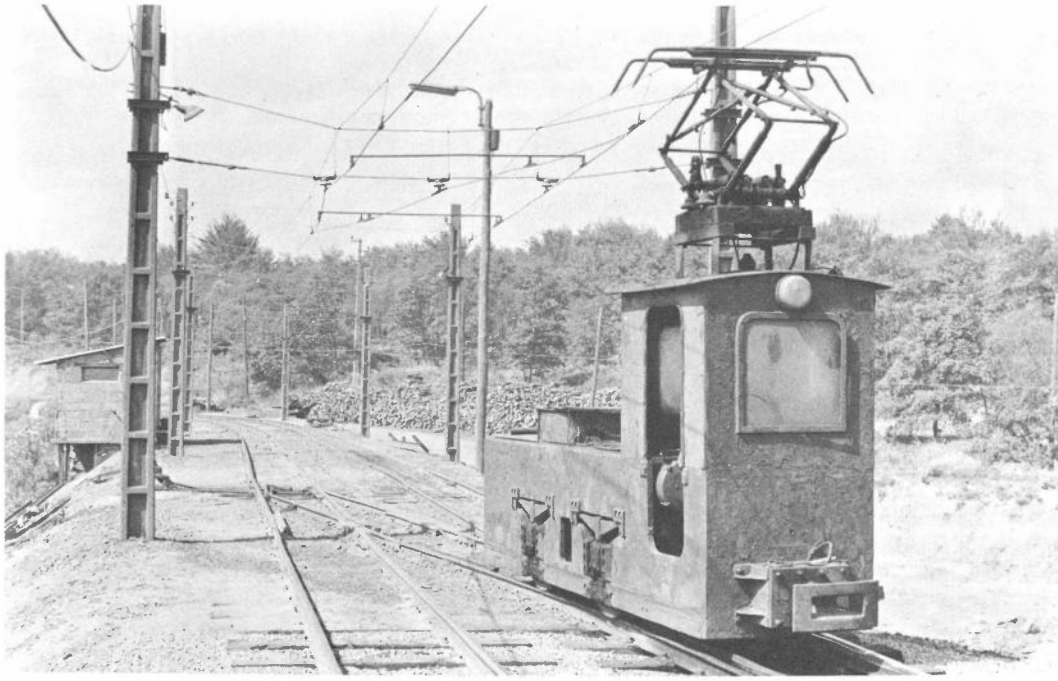
During 1954-55 an extensive modernisation programme was carried out and the original 630mm gauge line between shafts 1 and 2 and La Bocagerie was replaced by a 760mm gauge line using materials received from Germany as war reparations. This new line was 2.5km long. The remaining section between La Bocagerie and Le Chatellier SNCF station was relaid to standard gauge and realigned.

The modernisation programme extended not only to the tramway but also to the mine machinery. For the 760mm gauge line four new locomotives were acquired. Two were small two axle locos built by Siemens about 1952, and equipped with driving cabs at one end. The other two were also from Siemens, their serials 5443-4/1952, and numbered 2 and 1 respectively by the CCNM. These locomotives are a powerful 15 ton two axle mines type of sturdy appearance. All four were equipped with pantograph collectors for the 500 volt DC supply.

The two large Siemens locos at shaft No 1bis on 22 November 1974. (Siemens 5443/1952) is nearest the camera and No. 1 (Siemens 5444/1952) furthest away. (P. Pontremoli)



The Vetra loco on a coal train at La Bocagerie on 22 November 1974. In the background are the two small Siemens locos in the shed on the end of the 'bridge' section. (P. Pontremoli)



A small Siemens loco on the approach to the 'bridge' at La Bocagerie on 28 August 1975. Note the pre-cast concrete supports and tramway style overhead wiring. (P. Pontremoli)

The two smaller locomotives work the so-called 'bridge' at La Bocagerie, their light axle loading permitting operation over a long trestle which acts as a tipping platform for the wagons of ore to be discharged directly into the calcination kilns. Locomotives 1 and 2 operate the main line and haul long heavy trains between shaft 1bis and the kilns. In the terminology of the Halouze mines a train denotes transport of ore by two locomotive hauled sections closely following each other. During 1953-54 the small Vetra locomotive was re-gauged to 760mm and is now used exclusively at the coal siding. This is the only loco retaining the trolley pole collector.

At some time around 1968 the No 2 shaft was closed down, No 1 shaft having been closed previously and a new shaft, No 1bis, opened near the former No 1 shaft. The 760mm gauge line was realigned to serve this new shaft.

The remaining section of narrow gauge track carries very heavy traffic throughout the 24 hour working day from Monday to Friday, and also on Saturday morning. The mines produce some 1,900 tonnes of ore every day giving an average monthly production of some 40,000 tonnes. A series of 21 'trains'—that is 42 actual train sections—run during a normal 24 hour period, with a total of 462 wagons being moved during this period. On the coal siding the little Vetra loco operates as required throughout the 24 hour working day as required and has some 12 'berlines' each of 1.1 tonne capacity to handle.

Although the line runs through heavily wooded country there are many good photographic locations. Permits to visit the system can be obtained from the mines administration office located in the old No 2 shaft on the D217 road between Saint Clair de Halouze and Flers. It was to be expected that operations would continue for several years, but the recent recession in French steel production caused the mine's major customer, Société Metallurgique Normandie (SMN), to cease purchasing iron ore for the plants at Caen and Mondeville. The mines and railway closed down in December 1978, and although safety and maintenance work continues for the time being resumption of operations is unlikely. All the rolling stock and equipment was stored at Saint Clair de Halouze awaiting a decision on its disposal.

THE BRUSSELS EXHIBITION LOCOMOTIVES

In his article entitled "Narrow Gauge Railways of the Polish Sugar Beet Industry", which was published in *The Narrow Gauge No. 72,* Martin Murray illustrated an unusual 60cm gauge "Pacific" type locomotive lying at Lipno, in Poland during October 1972. It was one of six built for the Brussels Colonial Exhibition in 1935, and the photograph prompted R.C. Riley to provide these views of the locomotives at Brussels.

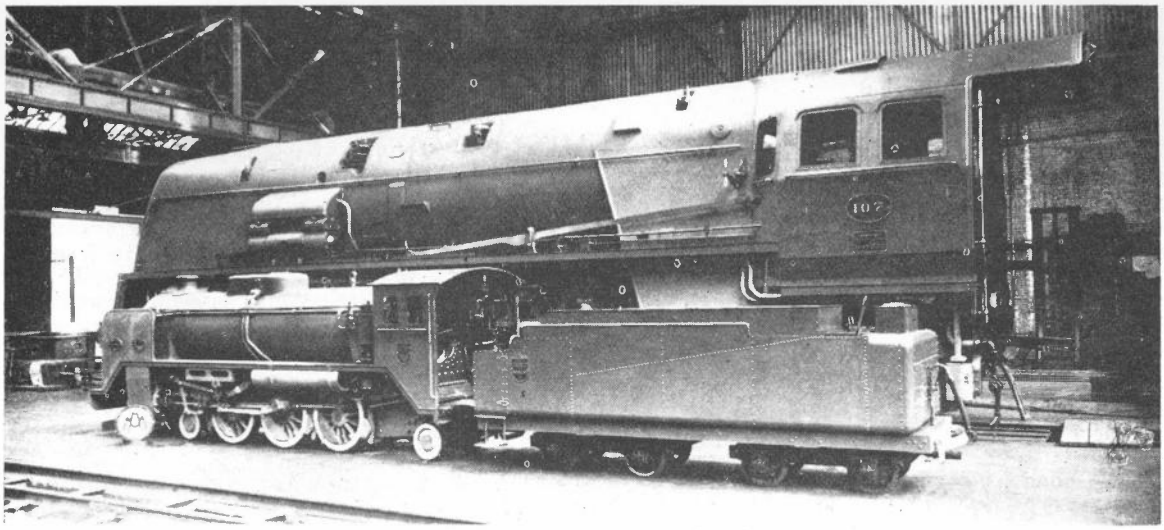
The 60cm gauge railway was a popular attraction at the Exhibition, but because it included severe gradients up to 1 in 25 and the trains were limited to 20 K.p.h. (12½ M.P.H.) really powerful locomotives were required. The builder was Les Ateliers Metallurgiques, Tubize, Belgium and the six Pacifics were named:

1 ADOLPHE	Tubize 2177/1935	4 EDOUARD	2180/1935
2 ADRIEN	Tubize 2178/1935	5 RAYMOND	2182/1935
3 CHARLES	Tubize 2179/1935	6 JOSEPH	2183/1935

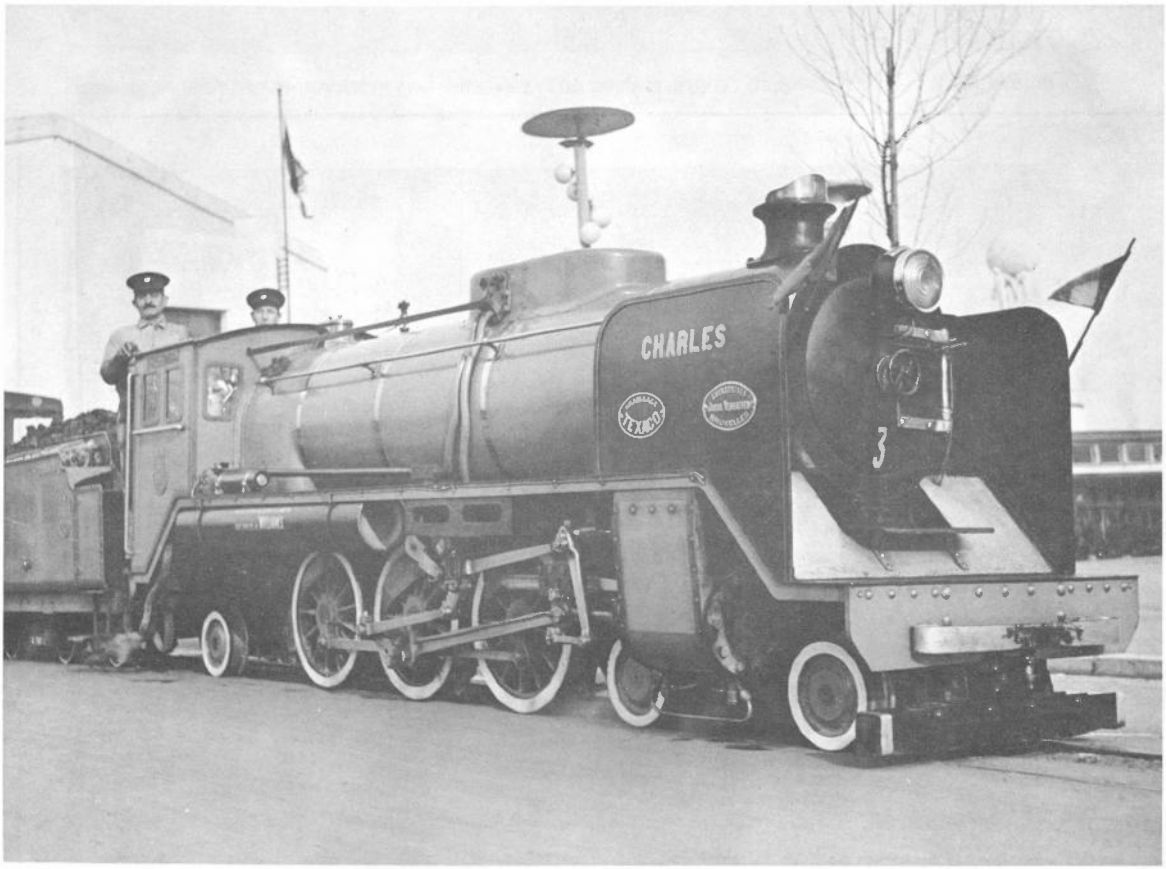
Each weighed 12 tonnes empty and was designated 100 h.p., being rated to haul a train of four bogie coaches each 4 tonnes tare with a capacity of 45 passengers. These coaches were also built at Tubize, and a total of 24 were supplied. Because of the severe gradients and speed restrictions the locomotives and coaches had Westinghouse air brakes. Electric headlights were fitted, possibly powered by a turbo-generator, and a mechanical lubricator on the footplate. The livery was light grey lined out in vermilion.

The locomotive in Poland has been identified as Tubize 2179/1935, but just how it came to be there is now a mystery. However, during the post-war shortage of railway equipment even such an unlikely machine could prove attractive to a hard pressed operator. It apparently worked at the Ostrowy sugar factory until the system was converted to 75cm gauge, and was then transferred to Chełmica. After this line closed the Pacific lay at Lipno until 1974, when it was moved to Warsaw, and is now at Znin for restoration and eventual display at the Polish narrow gauge railway museum at Wenecja.

An impressive view of JOSEPH and train at Brussels. A large Westinghouse air pump is fitted in front of the cab. The train consists of two covered and two open coaches. *(collection R.C. Riley)*



One of the 60cm gauge Pacifics beside a standard gauge Pacific in the works at Tubize. (N.G.R.S. Library)



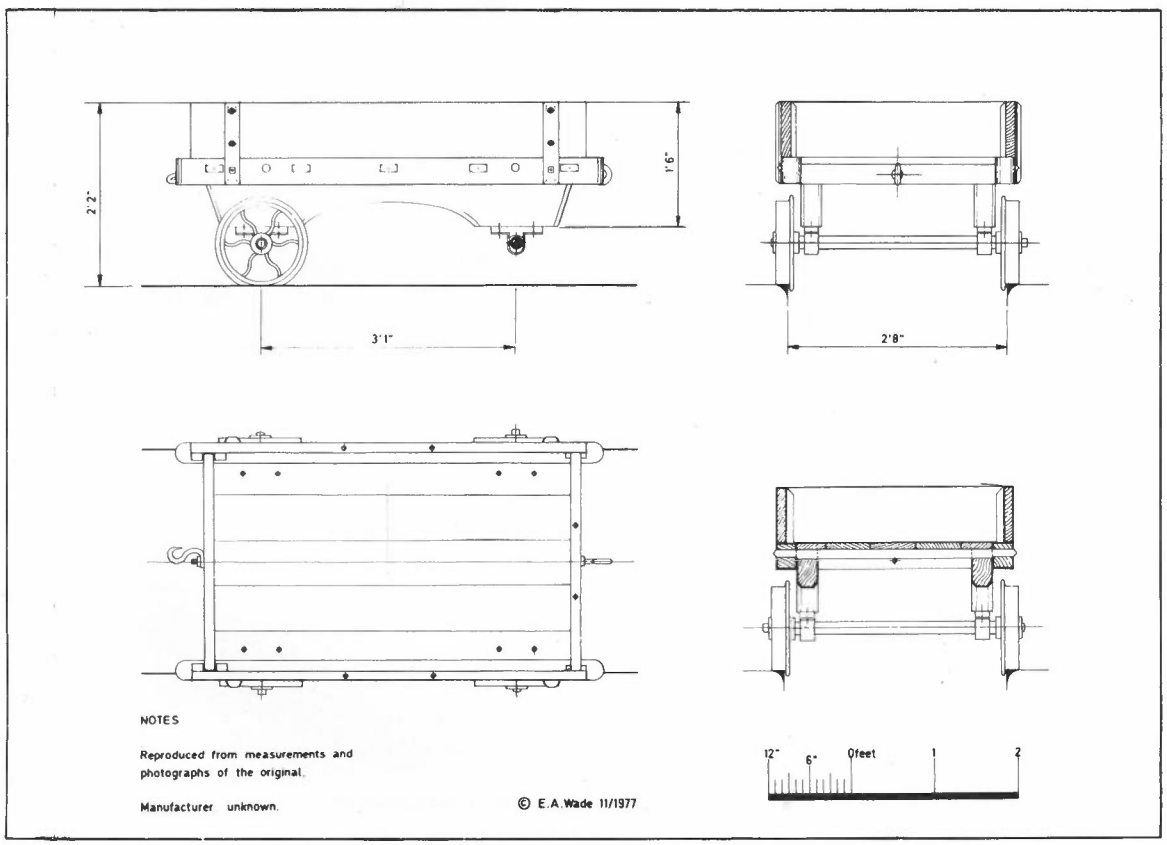
CHARLES is the locomotive which found its way to Poland and this picture makes an interesting contrast with that on p. 15 of "The Narrow Gauge" No. 72.
(collection R.C. Riley)

A WAGON AT WINDERMERE

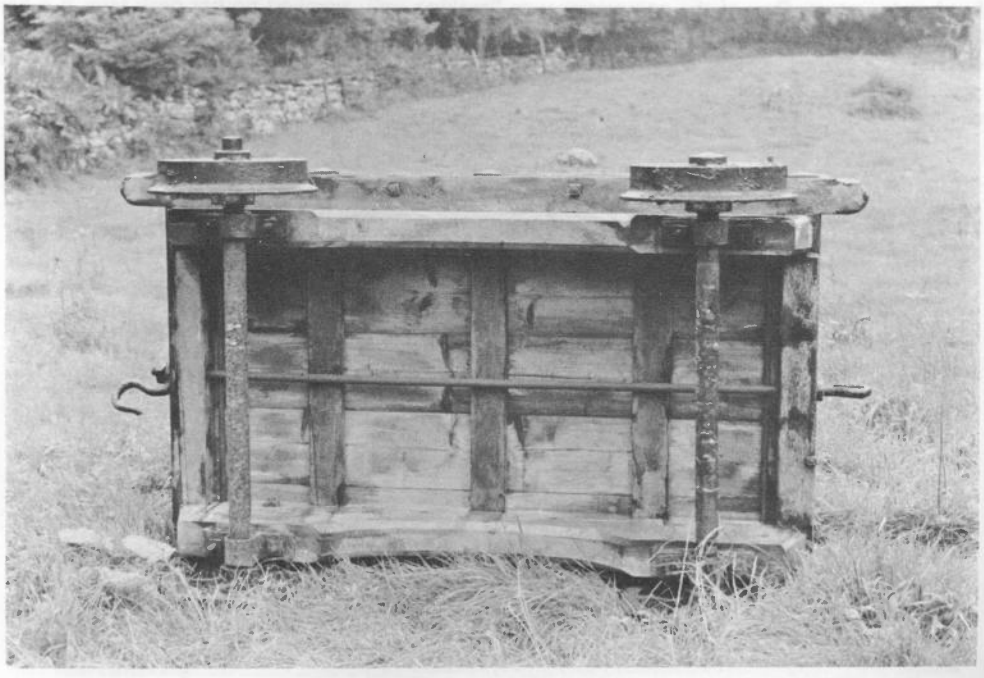
E.A. Wade

As a rule, I have but little time for the standard gauge but, on a recent trip to the English Lakes, I took time off to visit the Lakeside and Haverthwaite Railway. In the event I was glad that I did for, after leaving that railway, I drove north along the western bank of Windermere and, within a couple of miles, I stumbled across a tiny narrow gauge wagon. It lay in a field at the edge of the road and looked so interesting that, despite the persistant rain, I just had to measure it. The first thing I measured was the gauge which, at 2ft 8in, was unusual for a start. Within ¾ hour I had two soggy sheets of dimensions and I retired to the car and my wife; now convinced of my insanity. On returning home I printed the photographs and drew up my survey and proceeded to attempt to discover where it came from. As yet I have discovered nothing! I was told of a gunpowder line at Haverthwaite and found there were two; one of standard gauge (the Blackbeck Tramway) and the narrow gauge Low Wood Tramway. The latter seemed hopeful but turned out to be of 3ft 6in gauge. Dr Lee, the Society librarian, tells me that there was a narrow gauge line on one of the Windermere piers, for coaling the steamers but he is quite certain it was of 2ft gauge. So if any reader can enlighten me as to the origin of this wagon, I should be most grateful.

The wagon itself has many interesting features. Firstly, it is very small, which would suggest either limited clearances or heavy loads. The latter is unlikely in view of the archaic axle bearings. Though well made, the design is very crude but, judging by the small amount of wear, it cannot be very old. Possibly it has not seen much use; the wheel surfaces in particular look as good as new although their S shaped spokes suggest age. My own guess would be that it is a homemade vehicle using earlier wheels. One possible clue to its use is that one end is removeable. The wagon is certainly not designed to tip so perhaps some bulky object would have been slid into it. Who knows?



The wagon with the removeable end removed. The body is only 8" deep. *(E A Wade)*



The underside of the wagon, showing the simple bearings. *(E A Wade)*

WHAT SORT OF PROPOSITION IS THAT?

—16 mm scale narrow gauge locomotives for less than £5

Dave Rowlands

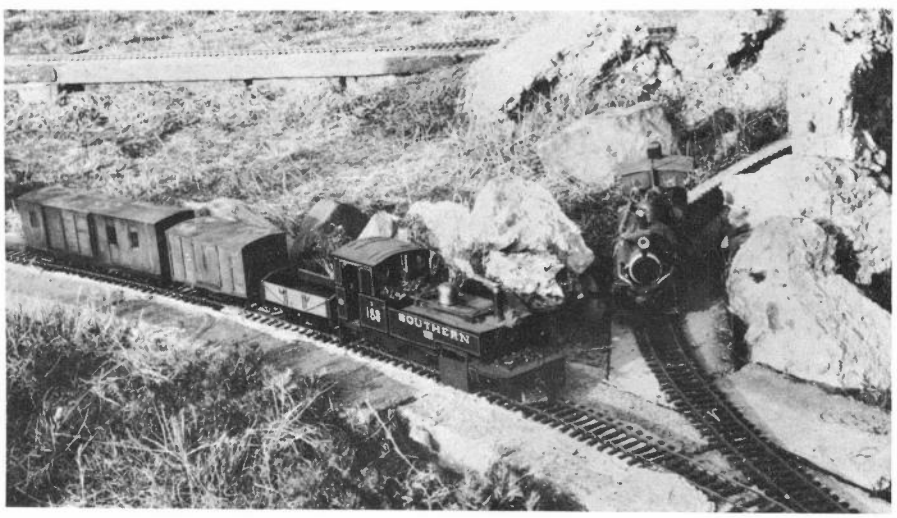
When a fellow takes on a wife, poverty is apt to ensue and once a mortgage is acquired any modelling has to be done on the cheap. The Ministry of Agriculture is not a lavish employer, but it did give me as room-mate David Pinniger, whose superb 7 mm scale models have enriched these pages before. Seeing my covetous glance at his Tralee & Dingle 2-6-0 tank, he gave me a lecture on Plastikard construction. Most of this went out of the opposite ear, but enough remained inside fermenting, to produce the most hideous 009 travesty yet perpetrated. Wearing dark glasses and biting his lip hard, he gave me some constructive criticism!

Being an 0 gauge and garden railway man by birth. I threw all discretion to the winds—like an aging lecher having a last fling—and purchased a Triang "Big Train" 0-6-0 at the local toyshop. After I had jumped hard on the revolting body shell, I was left with a working chassis. This formed the basis of my first model, a Tralee & Dingle 2-6-0 tank in 12mm to the foot scale. The photograph shows something of the method of construction in Plastikard, using the principles outlined by David Pinniger in *Model & Miniature Railways, 1974, No. 24, pp. 473-7*. The body is cut from 40 thou. and 60 thou. sheet, welded with MEK.

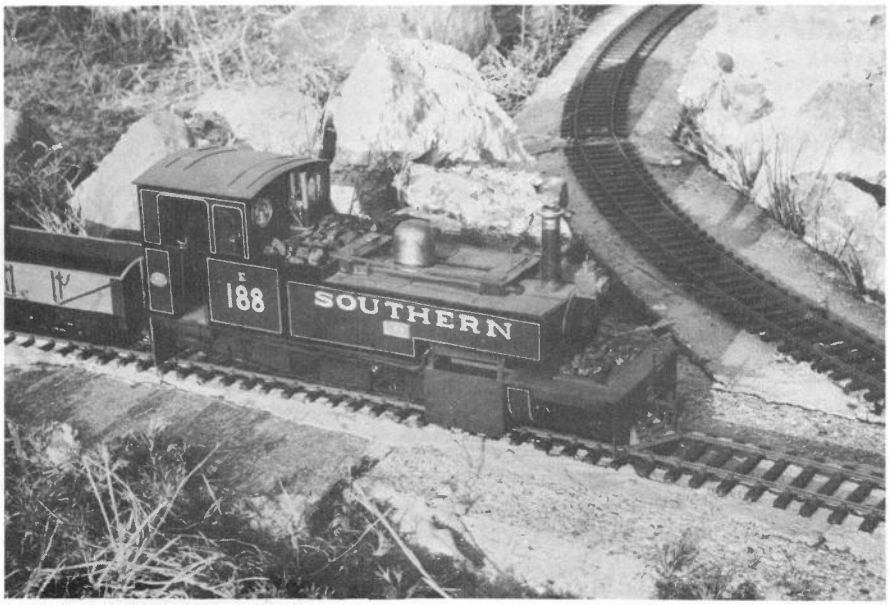
So, also with LEW, built to 16 mm scale. I am afraid that both these locomotives lack the valve gear (you try full Walschearts gear in styrene!), and the outside frames on LEW are dummy. Fittings such as domes, chimneys and so forth are from suitable plastic or other junk. The domes for example are rubber feet from metal chair legs. Painting and lettering of LEW was done by David Pinniger and transforms a mess of mediocre styrene into a work of art. Bless him!

Other boxes on wheels so built include RUSSELL, a Vale of Rheidol 2-6-2 tank, Welsh Highland Railway GOWRIE, a Hunslet W.D. 4-6-0 tank and a Darjeeling—Himalayan 0-4-0. Some of these use the works from a Lima 4F 0-6-0; after dentistry on the gear teeth to silence the noise.

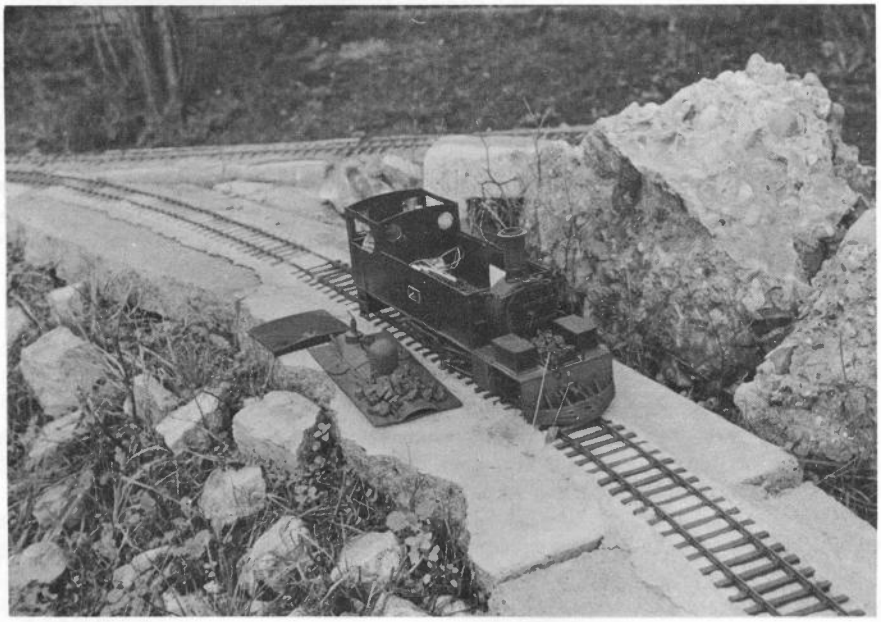
That tapering Inchicore chimney on the Tralee & Dingle locomotive was a real problem, until one day when I was at Union headquarters. One of the secretaries was "making up", perched on her desk (she is a luscious brunette with the sort of legs you see only once or twice in a lifetime); in one hand she held a mirror, in the other ....."Vyvienne" I said breathlessly, "Can I measure your lipstick tube?" "What sort of a proposition is **that**?" she asked.....You have guessed—it fitted the bill exactly! Cheap and atrocious though they were, these models gave me two years hard bashing in the garden before I went over to Archangel steamers.



LEW with Tralee & Dingle and Isle of Man stock, passing the D.H.R. loco. The latter is a styrene body on a Lima 4F chassis with the centre wheels removed
(D. Rowlands)

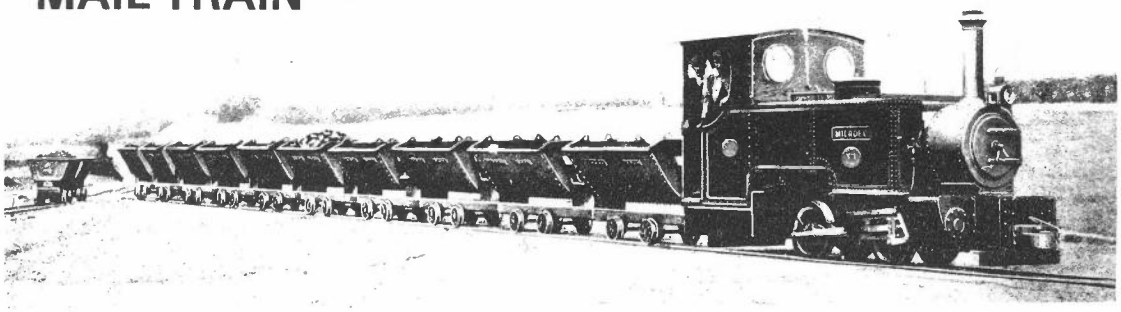


A side view of LEW with the connecting rod removed. There are more secrets behind that motion cover. The Plastikard body is mounted on a Triang battery driven 0-6-0 chassis, and though the lining and lettering is by David Pinniger he disclaims all responsibility for the rest. (D. Rowlands)



The Tralee & Dingle 2-6-0 tank disembowelled. Another Triang chassis with Plastikard body, lipstick tube chimney and rubber dome.
(D. Rowlands)

MAIL TRAIN



STEEPEST ADHESION WORKED GRADIENTS

Henry Gunston's letter (NG 78) is very interesting and there are few rivals to the Guayaquil & Quito Railway in its combination of length and steepness. I am not sure that his suggested league table is feasible because length, curvature, motive power, train weight and speed may be of much greater significance than relative steepness. But here are a few candidates for such a table.

A close runner-up to the G & Q is the Darjeeling-Himalayan Rly, with 40 miles from Sukna to Ghoom at an average of 1 in 29. It was built with long stretches of 1 in 20, but these were later eased. The steepest steam worked passenger line I have traced was the Uintah Railway in the United States, which had five miles at 7½% (1 in 13 1/3) south of Baxter Pass. *("Narrow Gauge in the Rockies").*

The Rimutaka Incline in New Zealand was 2½ miles long at an average of 1 in 15, with a maximum of 1 in 13. Although worked by steam locomotives on the Fell centre rail system, several adhesion locomotives were tried, and from 1936 passenger services were operated by ordinary petrol and diesel railcars.

An industrial line which once had workmens passenger trains was the metre gauge quarry line at Orahovica in Jugoslavia. This was 4.45 km long and climbed 225 m, an average gradient of about 1 in 20. Its maximum, however, was an impressive 8% (1 in 12½), and to work the line Krauss built a 0-12-0 tank, fitted with Riggenbach counter-pressure brakes, in 1939. This is now reported to be preserved in a park at Orahovica.

There are steeper gradients on purely industrial lines, but some sort of record must go to the Big Pats Creek—Little Ada River line of the Federal Timber Co. in the Upper Yarra area of Victoria, Australia. This was 3ft gauge, laid with wooden rails, worked by internal combustion tractors, and had eight miles of continuous 1 in 12. *("Tall Timber & Tramlines").*

Steep gradients are common on electrified lines, and two Swiss metre gauge lines deserve mention. The Bernina Railway has long stretches at 7% (1 in 14.3), notably most of the 10¼ miles from Alp Grum to Poschiavo, and there are similar gradients on the Montreux-Oberland Bernois Railway, which also has 2 km of 7.3% (1 in 13¾) from Jor to Les Avants. Also in Switzerland, Kraftwerke Oberhasl have a 500 mm gauge line in a cable tunnel 4925 m long from Guttannen to Handegg I power station, between Meiringen and the Grimsel pass, which has a maximum gradient of 8.8% (1 in 11.4). Although mainly used for maintenance it has a passenger service for schoolchildren, and is worked by a 10 tonne battery locomotive/railcar only 1.75 m high by 1.25 m wide, seating 12.

Our own Snaefell Mountain Railway, which has a Fell centre rail for braking, has a gradient of 1 in 12 for 85% of its 4.66 miles. In France, the S.N.C.F. Ligne de Chaminox (metre gauge) also has a centre rail for braking, long stretches of 7% (1 in 14.3) and 2.1 km at 9% (1 in 11.1) near the lower terminus of St. Gervais. In Austria the Strassenbahn Gmunden has a short length of 9.5% (1 in 10½) on chaired track at the top of the Kufer Zeile. This inspired the adoption of adhesion working on the Postlingbergbahn, Linz, which was designed as a rack railway—and looks it! In its length of 2.88 km it climbes 254.7 m, an average of 1 in 11.3, but the maximum gradient is 10.5% (1 in 9½). *("Die Postlingbergbahn").*

CROYDON, SURREY — DEREK BAYLISS

I read Henry Gunston's letter with interest, and several 3ft gauge Colorado railroads come to mind as being in a similar class to the G. & Q. The Silverton Railroad, running north from Silverton over Red Mountain Pass to Ironton and Albany, had the first 6 miles at 3% (1 in 33.3) and the remaining 12 miles at at 5% (1 in 20) except at

the summit and two switchbacks. The route included curves up to 30° (195 ft radius), without any compensation in the gradient. Passenger trains were usually one or two bogie passenger cars, with a baggage or box car, and hauled by former D. & R.G. 2-8-0 locos weighing about 30 short tons (27.22 tonnes). This road operated from 1889 to 1922. The neighbouring Silverton, Gladstone & Northerly, opened in 1898, was about 7 miles long and had a ruling grade of 6.5% (1 in 15.4) combined with even tighter curves of 40° (125 ft radius). Then, in 1903, the Silverton Northern Railroad was extended six miles to Animas Forks on a ruling gradient of nearly 7% (1 in 14.3). These two latter roads were also worked by old D.& R.G. 2-8-0 locos. The Uintah Railway not only had a 7½% grade, but this was combined with 80° curves (88 ft radius), later reduced to 66° (100 ft radius) including one describing a half-circle! Motive power was finally two Baldwin 2-6-6-2 simple articulated tank locos.

Other railroads worthy of notice are the Georgetown-Silver Plume branch of the Colorado Central, now partially relaid and opened as a tourist operation in 1975, and the Argentine Central, built in 1906 from Silver Plume to a ridge near Mt. McClellan. This was 16 miles long on a 6% grade (1 in 16.6) and worked by Shay locos hauling two or three observation cars. Some of the lumber railroads in the state had gradients up to 10% (1 in 10) and occasionally ran passenger trains, usually powered by old D.& R.G. 2-8-0's.

ST. PAUL, MINN. U.S.A. ROBERT E. SLOAN

The *"Guinness Book of Rail Facts & Feats"* lists the steepest incline worked by adhesion as 9% (1 in 11) between Chedde and Servoz on the metre gauge Chaminox line in France. The Glasgow Subway, with gradients of 5.5% (1 in 18) and 5% (1 in 20), in sections under the river Clyde, and the Burma State Railways metre gauge line between Mandalay and Lashio, climbing 12 miles at 4% (1 in 25), are also mentioned.

DIDCOT, OXON HENRY GUNSTON

(Other members have written giving similar information. Ed.)

GERMAN LOCOMOTIVE BUILDERS

The statement by Mr. Kuntze in his letter in NG80 " . . . . . it is doubtful if any German builder turned out 600mm gauge locomotives as early as 1888....."is incorrect as the following examples show:

Henschel 2096/1885) Rheinische Stahlwerke 3 and 4, which suggests that they probably already had two such
2097/1885) locos since I have found no trace of standard gauge locomotives here prior to this date.

Henschel 2211/1886; 2448/1887; 2539/1888; 2616/1888: Mechlenburg—Pommersche Kleinbahn No.4; 1; 2 and 3 respectively.

Henschel 2523/1889: Gericke, Berlin. (595mm gauge)

All these were 0-4-0 side tanks, from but one builder. I know of 50 similar Henschel locomotives of 600mm gauge or less built up to 1900, including many of the well-known "Zwilling" type 0-6-0T + 0-6-0T for the Heeresfeldbahn.

The Vienna factory of Staatseisenbahn Gesellschaft delivered an 0-4-0 tank to a private customer in 1887, and there are others elsewhere, though none so early as 1881'

VIERSEN, W. GERMANY M. SPELLEN

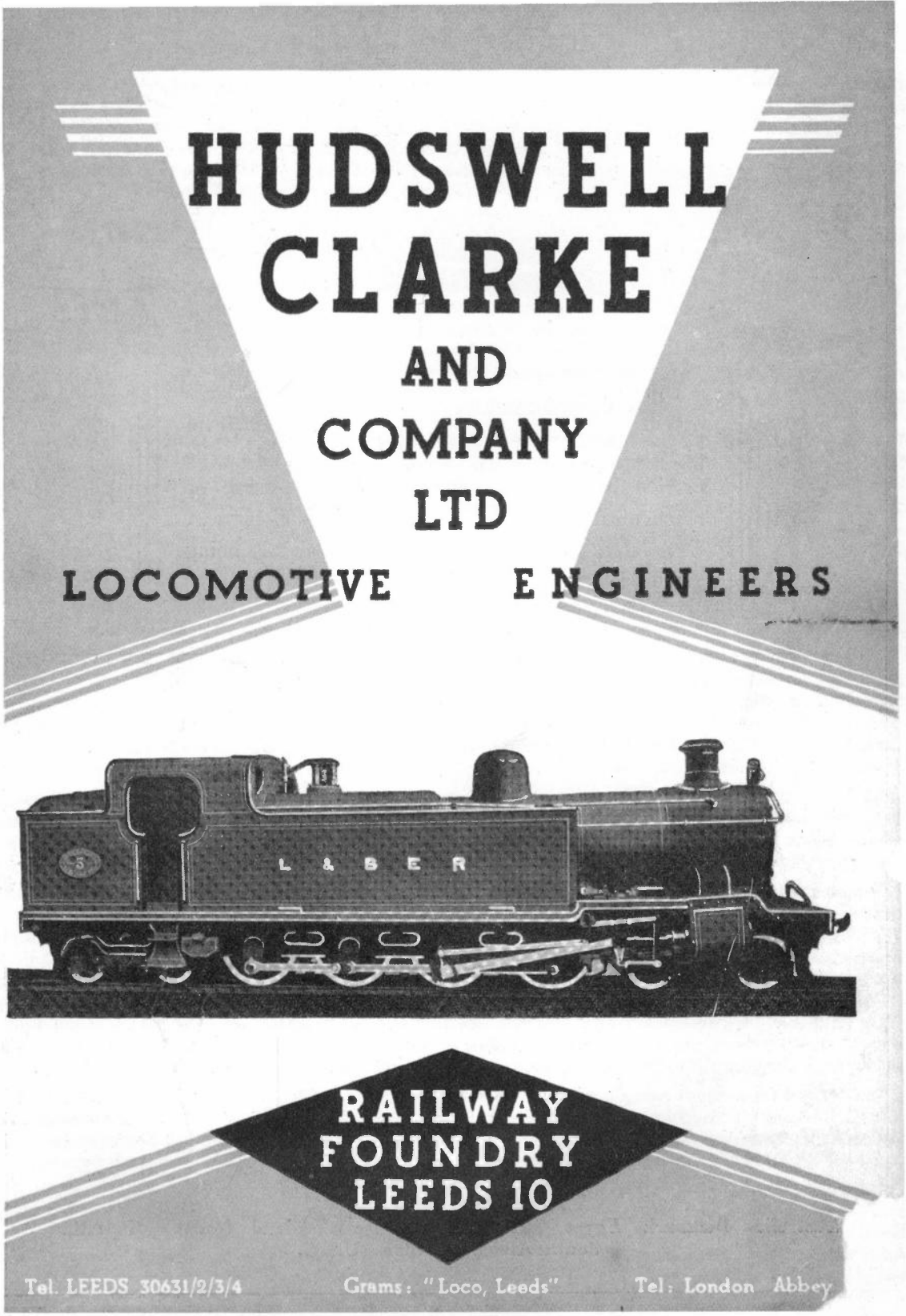
OVERSEAS PRESERVATION

Following the letters from Martin Murray and Peter Kuntze in NG80, may I add the following remarks in an effort to unravel the mystery of BABY SIVOK. If the engine is, as I suspect, the construction engine for the Faipur Forest Tramway, the actual customer is likely to have been Gillanders, Arbuthnot of Calcutta, and the date in 1885-90 period. Gillanders were the agents for both the RFT and the DHR at that time.

The boiler plate, which I have no doubt is genuine, reads: No. A 127 L New 1888, W.P. 120 lbs, 12:9:45, 19:9:50, 24:3:51, 14:9:51. Surprisingly, it bears no stamp to cover its operation during the 1953 exhibition! I do not think that Frank Jux's reference of 1881, was to the boiler plate, but rather to the notice board once attached to the exhibit. I discount that date completely.

The details of the engine is unmistakably Koppel and not Krauss, although the latter are known to have supplied to Koppel around this time, possibly to his design. The safety valves are not 'pop' valves, but simple direct spring valves, identical with those on the Matheran engines of 1907 and other pre-1914 O & K engines. Admittedly, Koppel used a modified form of Hackworth (or Marshall) valve gear on many of his narrow gauge designs, but certainly used the Heusinger gear extensively before 1914. Finally, the boiler contains 42 steel tubes which appear to be about 45mm outside diameter.

ORMESBY, CLEVELAND MICHAEL SATOW



Hudswell Clarke & Co. Ltd. continued to feature the Swilly 4-8-4 tanks in their advertisements for many years. This picture of No.5, lettered for the Letterkenny & Burtonport Extension Railway when delivered in 1912, appeared in 1947. *(N.G.R.S. Library)*