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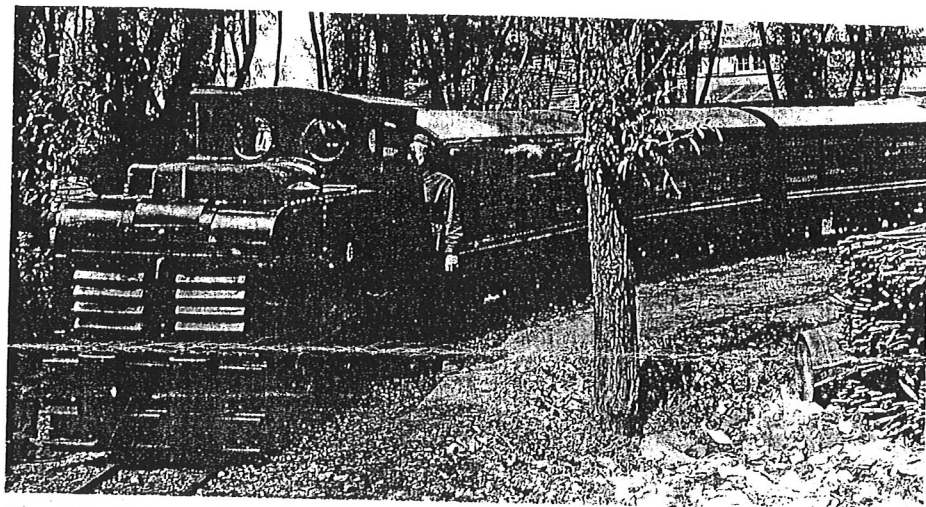
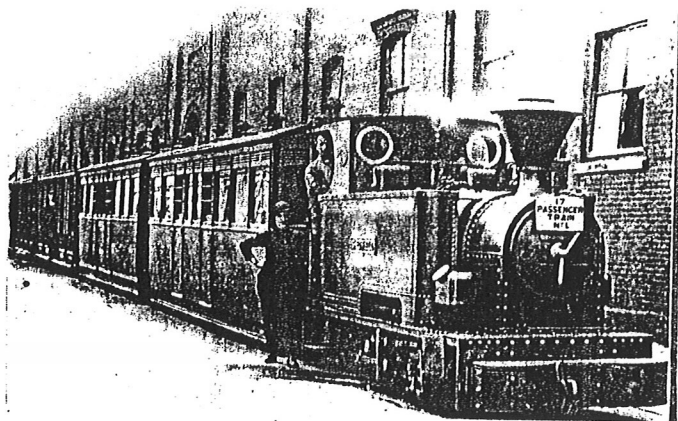
THE ROYAL GUNPOWDER MILLS RAILWAY PROJECT

By Mark Smithers

In previous issues of *Engineering in Miniature* I have discussed the important role played by the functional 18" gauge railway in the wider context of railway history generally. Although regarded by some commentators as merely a fringe element, it must be remembered that such systems encompassed the longest steam-worked narrow gauge railway on the British mainland; the first successful 'mainstream' series production sub-2 ft 6" gauge steam locomotive design and the first successful British internal combustion locomotive, along with other distinctions. As has previously been documented, railways of this gauge were associated chiefly with military support applications in the London area, and examples could be found at the Royal Arsenal; Chatham Dockyard; Deptford; the School of Military Engineering; Longmoor; Aldershot; and the Royal Gunpowder Mills at Waltham Abbey. Although a representative selection of equipment survived to perpetuate the memory of this often-forgotten facet of Britain's railway heritage, the greatest obstacle to the establishment of a credible and geographically appropriate preservation site was the fact that the largest of the three known workable surviving steam locomotives, together with much historic rolling stock and a unique diesel, had been relocated to a relatively new pleasure railway in Devon. The equipment, which had formerly been part of the stock of the dual gauge Royal Arsenal Railways, was the mainstay of the Bicton Woodland Railway from that line's opening in 1963 until its replacement by new items in 2000. The decision to release the Bicton stock made possible its return for display and possible operation at a suitable relevant site in the London area.

A small part of the once-extensive Royal Arsenal site at Woolwich, including

'Charlton' class Avonside 0-4-0T locomotive 'Sheffield' with a passenger train on the Royal Arsenal Railway system, probably in 1919. The two carriages nearest the camera are of the Woolwich-built variety referred to in the text.

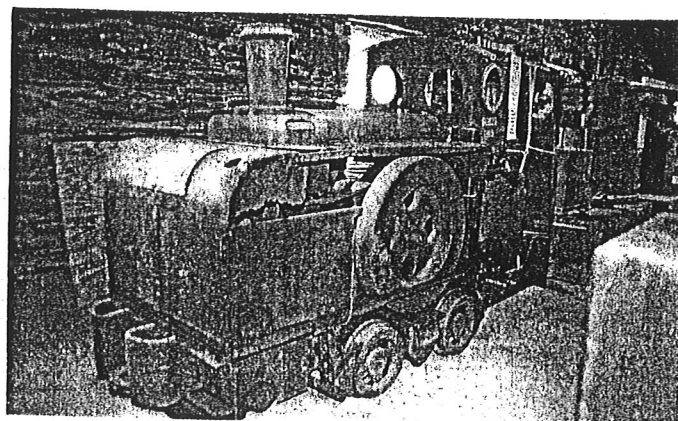


One of the 18" gauge Ruston Proctor 'ZLH' locomotives with a train of cordite paste wagons on the Royal Gunpowder Mills railway during the latter part of World War I.

the distinctive Dial Square terminus shown in contemporary footage held by the Imperial War Museum, is still extant and it would therefore have been theoretically possible to have returned the ex-Bicton equipment to its rightful home. The difficulty inherent in this course of action is that current plans for the Arsenal site do not envisage the restoration of a working railway and the best that could have happened is that the locomotives and rolling stock would have been placed on static display. Similarly at Chatham Dockyard, the policy decision was taken with effect from 1949 to dispense with locomotive-worked 18" gauge operation (apparently resulting in the scrapping of the three surviving locomotives 'Sunbeam', 'Thistle' and 'Ready') and concentrate on the standard gauge network. The preservation era at Chatham has therefore been very much centred around the standard

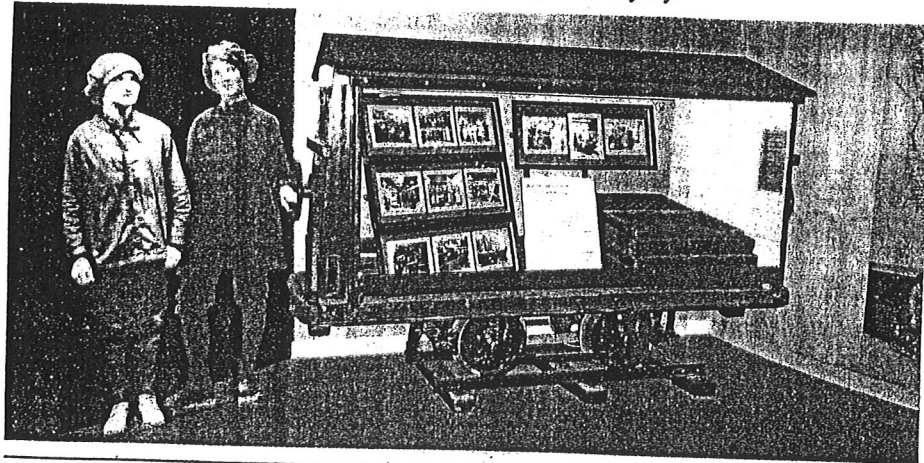
gauge line and there would be little call for the reinstatement of a significant portion of the narrow gauge network, let alone the restoration of locomotive operation on it. Prior to the commencement of the project that is the subject of the present feature, the most extensive and complete surviving British military support railway of 18" gauge was a now derelict system divided into two portions at Fort Camden near Crosshaven in the Irish Republic. Even this system is currently out of reach of public view for legal and safety reasons. The last realistic hope for an operational display at a relevant location at home lay with the Royal Gunpowder Mills at Waltham Abbey as part of this site, along with several historic buildings, have been transferred to a charitable trust in recent years. Its development as a tourist attraction is now well under way and public opening commenced during last year.

Metre gauge Ruston-Protor petrol-paraffin locomotive of 1915 on display at Gloddfa Ganol in 1993. It is now at Aberystwyth. The 18" gauge locomotives used at Waltham Abbey were of similar design.

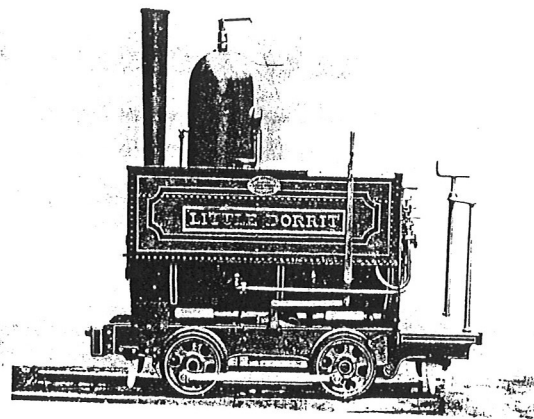


The manufacture of gunpowder at the Royal Gunpowder Mills North Site is believed to have commenced during the seventeenth century and its initial transportation needs appear to have been satisfied by the abundance of waterways present at the site. The earliest railway there (of approximately 2 ft 3" gauge) made its appearance during the latter part of the 1850s decade. Significantly, the Royal Gunpowder Mills was under the same management (the Director General of Ordnance Factories) as the Royal Arsenal at Woolwich, which was ultimately to utilize in excess of 100 miles of 18" gauge trackwork. As the nineteenth century drew to a close, the Royal Gunpowder Mills went over to cordite manufacture and operations expanded to include an additional site to the south of the Waltham Abbey-Waltham Cross road (the South Site). By the 1890s the railways in use at both sites were of 18" gauge and wagons were being supplied from the Royal Arsenal, but the connection of the two Royal Gunpowder Mills sites by rail and hence the full integration of the system had to wait until 1916-17. The connecting railway was no mean feat of engineering, and featured three swing bridges to allow the passage of canal traffic and a tunnel (below the level of the Lea riverbank) passing underneath the main road. At the South Site, access to the main standard gauge network was obtained by means of exchange sidings with a line from Enfield's Royal Small Arms Factory that connected with the G.E.R. system at Brimsdown. The new 18" gauge line was partially locomotive-worked, initially with the aid of four Ruston-Proctor 'ZLH' class single cylinder four-wheeled 4½ ton petrol-paraffin locomotives, and was a little over 1½ miles in length. Unlike what was to happen at Woolwich, the 1918 Armistice did not spell contraction for the 18" gauge system at Waltham Abbey and it remained in use, latterly with battery-electric traction over 3½ miles of the system, into World War II. The beginning of the end came in 1943 when explosives manufacture ceased at Waltham Abbey and the complex was turned over to research purposes, subsequently becoming the Royal Armaments Research & Development Establishment (RARDE). The railway was progressively dismantled during the ensuing decade and a half, although important relics such as the North Site shed originally used

Hand-pushed ex-Royal Gunpowder Factory railway system Robert Hudson cordite paste wagon now used to display photographs of the railway in its heyday.



A future candidate for a replica? Ramsbottom-derived 0-4-0 tank locomotive with inside cylinders 'Little Dorrit' built by Sharp, Stewart in 1870 to the peculiar gauge of 18½" for Ebbw Vale Steel Works. Any replica would need additional water feed arrangements as the original relied on a solitary injector.



by the Rustons and the swing bridge to Great Hoppit Island remained extant into the 1980s. As we shall see, some smaller relics remain in existence to this day.

The section of the complex currently in the possession of the charitable trust, encompasses a portion of land at the North Site that was served by the earliest of the 2 ft 3" gauge railways and later by part of the integrated 18" gauge system. It is therefore totally appropriate that the first part of the new 18" gauge railway should be constructed on this section. The proposed route of the first phase is shown in the accompanying plan, and its location has also been influenced by the fact that the land there has not suffered unduly from the decontamination process undertaken during the 1990s prior to release of the site by the Ministry of Defence. Examination of the plan reveals one immediately apparent difficulty, namely the need for some form of reconstruction of the waterway bridge ('BR4') that still bears sleeper traces of the two tracks that once crossed it.

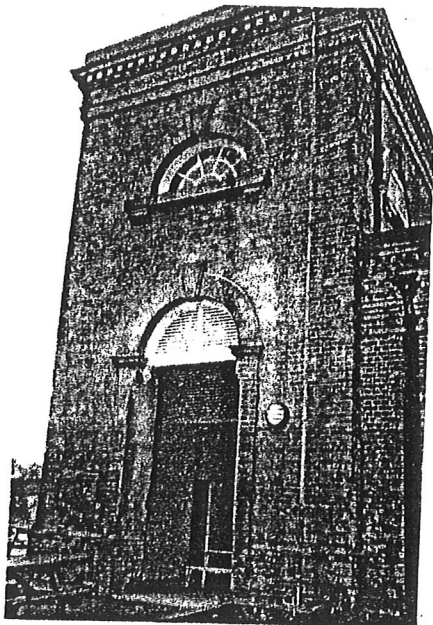
As the bridge was originally constructed to cope with an axle loading in the region of 2½ tons, it is hopelessly inadequate to cope with the 6-ton axle loading of the ex-Royal Arsenal Railways 'Charlton' class Avonside 0-4-0T Woolwich that will feature extensively in the railway's future plans. The importance of historic buildings to the projected line's atmosphere is not forgotten, and the locomotive shed will be located in a surviving portion of the Group A Mill (L168) that was erected in 1857. The line will also pass close to building L149, formerly the Group E Mill prior to terminating in a balloon loop at its northern end.

The ex-R.A.R. equipment and other exhibits

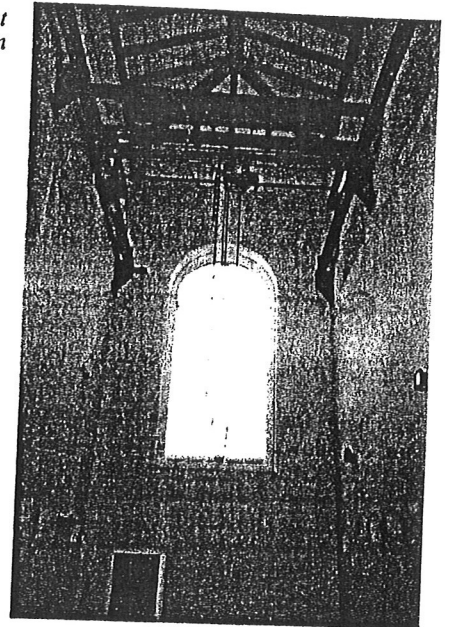
The four 'ZLH' locomotives that were the mainstay of the Royal Gunpowder Factory railway system during the latter part of World War I were apparently disposed of during the 1920s. The last survivor is believed to have been scrapped as a 2 ft gauge locomotive at Mold in 1953 after a long period of employment in the Oakley slate quarries at Blaenau Festiniog. The other 'ZLHs' of wider gauge survive today, but neither is likely to be available for display at Waltham Abbey in the foreseeable future and, in any case, their historic value should be a barrier to any attempts to regauge them. The ex-R.A.R. equipment acquired from Bicton via Alan Keef Ltd. comprises the previously mentioned 'Woolwich', a 1954-built double-bogie Hunslet diesel-mechanical locomotive named 'Carnegie' (at the time of writing receiving attention to its rear gearbox at Alan Keef's premises); six bogie passenger carriages on 1901-15 vintage underframes; and a 1914 vintage bogie open wagon. There are sundry other items of rolling stock from Bicton and these include a selection of open four wheel hand-pushed wagons originally from Wolverton carriage works. Although small sections of original track from the Royal Gunpowder Factory system do still survive, including a short length using wooden rails in one building, the only rail-mounted piece of original rolling stock in existence is a Robert Hudson four wheel hand pushed cordite paste wagon believed to date from 1939. This is currently on display under cover and is a fortunate survival given that the last of the once ubiquitous hand pushed wagons at Woolwich perished in the early 1970s. Three further ex-Royal Gunpowder Factory wagons were converted for road use and survive in this form. As they were of the locomotive-hauled variety, their restoration to original condition would allow the display and operation of a representative explosives train.

Future plans (and dreams)

As the 2001 season was largely taken up with the opening of the site to the public in a general context, it is hoped that construction of the railway will commence during the winter 2001-2 period. After preparation of the locomotive and rolling stock sheds and some initial track laying, the initial priority will be to get 'Woolwich', 'Carnegie' and the passenger rolling stock 'up and running' in time for at least part of the 2002 season (the ten



Left: The 1857-vintage portion of building L168 that will become the shed for 'Woolwich' and 'Carnegie' seen showing the portal and associated northern face.



Right: The inside of the shed showing the currently disused overhead crane that has a capacity of 5 tons. Once restored to working order this will facilitate maintenance work in 'Woolwich' and 'Carnegie'.

year boiler certificate for 'Woolwich' will require renewal at this time). Once this has been achieved, there is then the potential to augment the current Royal Gunpowder Factory railway display with a meaningful commemoration of the functional 18" gauge railway from 1862 to the present day. In addition to copies of the many photographs, drawings and maps that survive (including one of the Royal Arsenal system at its zenith), this could include more substantial items on loan. Possibilities here include the two intact covered explosives wagons from the 'Arsenal, ex-Chatham Dockyard cast-iron tram plates and the sectioned boiler from Vulcan Foundry 0-4-2 Tank locomotive 'Mars' that once saw service at Longmoor.

Although the present level of funding would not support expansion of the railway project beyond the extent so far detailed, it would be constructive at this stage to state the case for further funding and outline the long term potential of the project. The important point to note is that, as with the Sittingbourne & Kemsley and Leighton Buzzard systems (which are situated at a respectable distance away), Waltham Abbey has the all-important historical pedigree that is absent from other albeit fine narrow gauge attractions such as

at Whipsnade or the Old Kiln Light Railway. Such a pedigree would certainly justify proposals to extend the track northwards beyond Phase One if a suitable formation can be decided upon. Secondly, it can be argued that the 18" gauge systems were in their own way as influential on narrow gauge railway development generally as their better known contemporaries in North Wales. Thirdly, much useful expertise for the construction of suitable replica locomotives has been developed in recent years. Much of the experience gained by Great Northern Steam of Middlesbrough in the construction of the replica Heywood locomotive 'Effie' would be useful if a working replica of, for instance, the Crewe Works locomotives or 'Little Dorrit' were required. A fact of significance here is that the replica 19" gauge inside cylinder Lewin locomotive, currently in preparation for Laxey on the Isle of Man, is being designed so that its cylinder patterns and other components would fit an 18" gauge locomotive and could thus be used for such a project. Similarly the research necessary to produce the splendid 5" gauge model of pioneering R.A.R. Hornsby-Ackroyd oil locomotive 'Lachesis' (*Engineering in Miniature* November 1998) would also be useful in

the production of the full size version. Much research has also been undertaken with regard to the historic Manning Wardle 0-4-0STs for Woolwich and Chatham (see *Engineering in Miniature* December 1991) and a design for 7 $\frac{1}{4}$ " gauge model is currently in an advanced state of progress. Once again, therefore, we have useful expertise for the construction of a full size replica of a very important design. From the rolling stock point of view, it would be desirable in the long term to restore all of the surviving ex-R.A.R. bogie underframes as explosives wagons for demonstration purposes (using the one intact survivor as the pattern) and recreate the distinctive 6 ft wide low-solebar Woolwich-built bogie carriages as replacement passenger vehicles. Useful experience has already been gained in this context, as a 15" gauge carriage design using similar chassis principles is in use on the Perrygrove Railway in Gloucestershire.

In summary, therefore, the Royal Gunpowder Mills Railway project offers an interesting and relevant narrow gauge railway attraction for the London area in the near future, together with a great potential for expansion and development in the long term, should the funding become available. Any reader wishing to get involved in the

project should contact John Bowles at 9 Humber Road, London SE3 7LS for further information. ▲

