

6. PEAT TRANSPORTATION

6.1 Barrow usage

Individual human transportation was based on carrying turves and, increasingly, on the wheelbarrow. It is likely that these latter were in regular use at peripheral peat workings. The earliest known reference, to “Turfe barrows”, comes from the 17th century (Rawcliffe History Group 1989), presumably employed on the relatively firmer parts of the peripheral workings. It seems that wheelbarrows were not used in the earliest moss litter years, when the interior areas were opened up, since the terrain could be very arduous to work. However, this would not have precluded the employment of hand-barrows. This difficulty may have prevented an initial transference of wheelbarrow usage to the more central workings, which could even have then persisted beyond its relevance. This possible inertia may not have been broken until the introduction of the Dutch working methods in 1894. A description of the establishment of the new Dutch techniques on the Griendtsveen sector of Thorne Moors (*Doncaster Gazette* 18 October 1895) outlined the main changes for the English employees of the company:

Hitherto they had cut the turf in large blocks, and these were carried away by boys and stacked to dry; now the one block was to be cut into three, the boys were discharged, and the men themselves were provided with barrows in which to wheel the sods away.

The use of boys to carry the turves presumably represented the end of earlier practice – for long based on family units – with little change until the 1890s.

From at least that decade until the 1960s, wheelbarrows were unquestionably integral to peat winning, operated singly or in pairs. They were wheeled along planks where necessary. The Dutch methods required planks on a greater scale than the English equivalent, and planks were also used when loading the peat barges. The only obvious physical change in the appearance of any type of wheelbarrow (Dutch and English) occurred during Fisons’ years, when the stacking-barrows often had their metal-rimmed wooden wheels replaced by wheels with pneumatic rubber tyres. Most wheelbarrows were made locally, often – and eventually entirely – at the Moorends Works, though at least the earliest Dutch ones are recorded as having been imported. When assessing the important role of canals and tramways in removing huge tonnages of peat, the more prosaic and often less obvious use of wheelbarrows and hand-barrows *within* the peat workings should also not be overlooked.

6.2 The canal network

In addition to alien peat winning methods, the Griendtsveen Moss Litter Co. superposed Dutch custom at Thorne in a further way. This was the planning and commencement of a canal network on the Griendtsveen moor, for internal peat haulage to the Moorends Works using horse-drawn barges. The British Moss Litter Companies continued to operate the usable canals until 1922, when the fire in January of that year severely damaged the Moorends Works. All production was permanently transferred elsewhere, and the canals being thus redundant, became neglected.

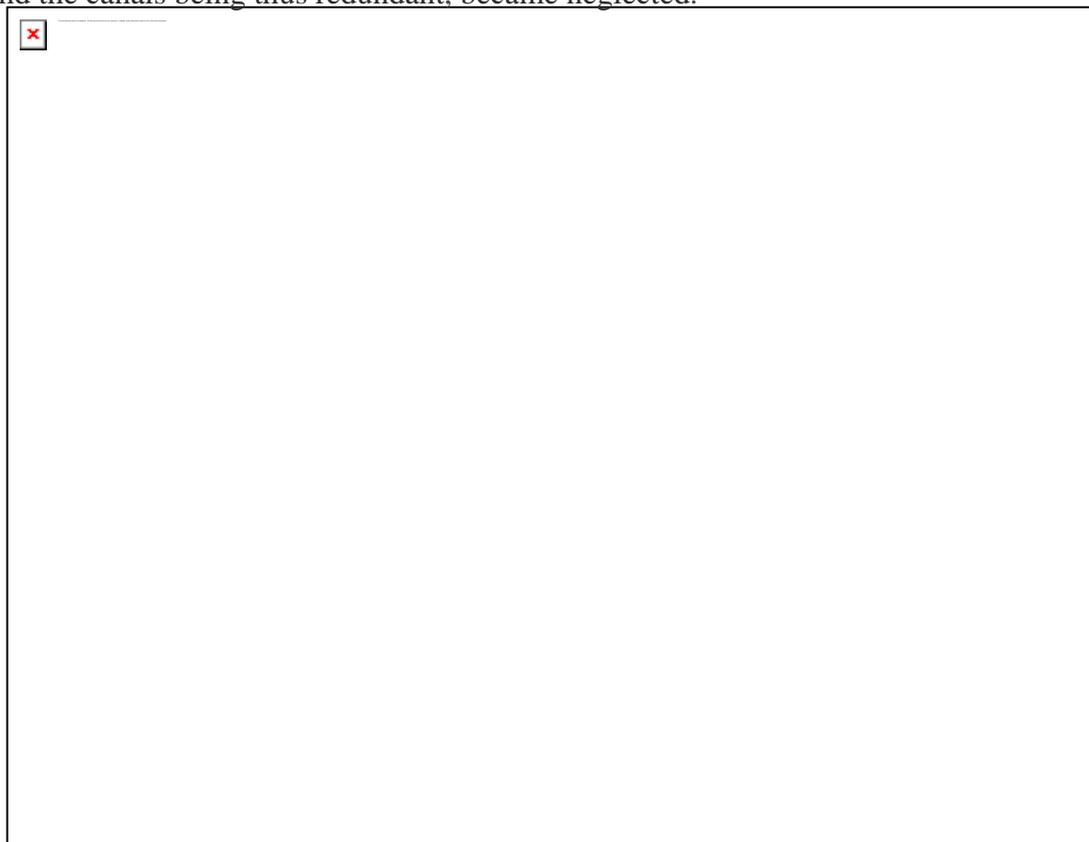


Figure 32. Plan of the Dutch canals on Thorne Waste.

Information on constructing the canal network is almost entirely lacking. Nor is it practical to extrapolate from Cromptvoets (1981). The only traced original account is a report (published in Pouls 1987) for Griendtsveen dated October 1895, of which a translation reads:

The quality of the peat is good and is in many ways similar to that of the workings at Asten. After the moor has been drained, some areas will be soft and others will yield hard peat. Mixed thoroughly, the end result will give good quality peat.

The condition of the workings this year is as good as can be expected from an area where forced drainage is used. After one more year of activity, and during that period deepening as much as possible the small trenches and [rows?] (for the drainage), then the

terrain will [] sunk as such, that without concern for subsidence, all the canals can be dug, whereby the operation will reach its potential.

When the canalisation is complete...then it will be possible to process the peat from all parts of the workings. During the coming winter and the following spring the peat can then be dug from between the canals, and will be blue coloured (they are filled with water before winter sets in) and processed...

The canals...can be dug first in the spring, at the driest areas first, and so on until the summer and autumn of 1896 when the whole canalisation will be completed.

To adopt this working method will enable the holding on to the peat supply until the canals are ready, whereby a new supply can then be brought on.

During my residence we have taken numerous water-level readings in order to establish the height, whereby the bottom of the aqueduct over [Durham's Warping Drain] in relation to the land had to be set. This height is determined at 30cm beneath the underside of the bridge sleepers over the same drain.

The reason that the costs to exploit peat workings, and thus the unit price of the peat, are higher than in Holland, also in comparing with the higher wages that have to be paid in England, is basically caused by the fact that the English workers are not quite familiar with the type of work. Also the reluctance of the English workers to adapt to new working methods. This latter problem, however, will eventually resolve itself, as every time a new method is introduced, with it a batch of Dutch workers is also brought on to the scene, who are familiar with the new method. The English can then see the new method, and that it is more remunerative, with the result that the English become willing employees. I have spoken about this with Mr van den Berg, and it will be necessary for the English workers never to show their dismay and to get on with the job...

The factory building [Moorends Works] is built well and the segmentation inside the factory is well appointed. There is enough room to package everything, and everything else is well equipped. The manufacturing process shall, especially after one year, cost no more than in our factories in Holland. Thereby I am satisfied in believing that I have recorded my experiences as accurately as is possible.

The canals were dug by the Griendtsveen Moss Litter Co. into and within the peat, except that part beyond the peat next to the Moorends Works. They were, in effect, broad, steep-sided peat cuttings, quite separate from the older watercourses draining Thorne Moors [1]. The main link was dug between Moorends Works and the peat workings about 1 mile distant. This waterway was c.6ft deep and up to 30ft wide (at least the width of two barges), with occasional cut out embayments. Its direction of flow was minimal and towards the works. It was flanked on its northern bank by a

towpath of limestone chippings. It had to cross an existing drain, Durham's Warping Drain, and this was accomplished by building a brick and iron aqueduct, c.14ft wide, in 1895 [2]. The canal narrowed at this point, but broadened out again on either side. At the peat workings, it was envisaged that the main canal should diverge and form three approximately parallel canals, up to 26 chains apart. They were not exactly aligned with each other, as they had to fit between the existing courses of Shearburn & Pitts Drain, Mill Drain and Cottage Dyke, which themselves are not quite parallel. Due to the further existence of Thousand Acre Drain, marking the eastern side of the Griendtsveen property, each of the three parallel canals reached approximately 88, 98 and 108 chains in length, north to south. The latter of these is known to have been completed and used before the organizational changes of 1896. This too was flanked on its northern side by limestone chippings laid on the peat, as a continuation of the towpath to the works. The central one was also dug, but there is no evidence of a towpath. However, the northernmost canal was not dug, being simply marked out in the peat [3].

At vulnerable parts of the usable network, especially corners, which were difficult for the horses, the sides were sometimes protected from impact by wooden pilings, or sleepers. Access was achieved by simple wooden swing-planks and -bridges.

It was intended that from the three canals excavated, 31 'lateral' canals should emanate (9, 10 and 12 from each one north to south), to be cut 10 chains apart. The distance is given erroneously as 9 chains by Smart (1983) and Smart et al. (1986). The longest of these, the westernmost lateral of the southern series, was over 33 chains long. Two smaller series, amounting to six further laterals, were also dug, one pair linking with the main canal to the Works, the others joining on to the westernmost lateral of the southern series (Figure 32). None of these exceeded a distance of almost 11 chains from the next, and the longest (the most northern) was over 32 chains long.

The completed lateral canals, which did not have attendant limestone towpaths, were narrower than the main one, but of similar depth. The surviving lateral canals of the southern system (numbered 1-8 west to east), though no longer easy to measure, tend to be ± 25 ft wide (numbers 1-4, 8), or narrower, maximum c.18ft wide (numbers 5-7). Along these narrower canals are occasional, irregularly distributed, sections, where the banks have been cut out, creating short, straight-sided embayments, making them in

total ± 25 ft or more in width at these places, and thus about as wide as the broader canals. It is believed that these were passing places for the barges, or perhaps areas for temporarily holding them without creating an obstruction. The former possibility was surmised by Goodchild (1971-73), Smart (1983) and Dargie (1988), and may be inferred from Cromptvoets (1981).

Of the planned 37 lateral canals, only the southern series of 12 was certainly exploited and used. The central laterals and the two smaller series were dug, but there is no evidence of use, and a lack of towpaths makes their usage doubtful, unless all barges were manhandled on the laterals. Again, the northern examples did not progress beyond being marked out on the surface. The projected total length of the entire system was reported to be over 14 miles (*Goole Times* 4 August 1899, *Doncaster Gazette* 11 August 1899; Nunn 1905). A measurement of the system as shown on large scale Ordnance Survey maps, including the part marked out but not dug, confirms this figure at c.15 miles. However, the percentage actually boated on was only c.45% of this latter figure.

It was said, with an unknown degree of accuracy, that the Griendtsveen Moss Litter Co. hoped to link the canals via a waterway based on Angle Drain and Thorne Waste Drain, with the southern edge of Thorne Waste. Despite the existence here of the Stainforth and Keadby Canal, it was presumably hoped to transfer peat to the railway that ran alongside.

In addition to the peat canals and the associated workings, a drainage network was also excavated into the peat, quite separate from the canals, these watercourses being connected to the pre-existing drains on the moorland. In general, in describing the southern canal system, and thus the best preserved example, each lateral canal was flanked by a drainage dyke on either side, joined to the south with an older drain. Equidistant between each pair of lateral canals, a drain was cut, and at right angles to this, 0.5 chain apart, drainage ditches were formed, each linked to the canal-flanking dykes on either side. In at least some parts, *three* exactly spaced drains ran parallel between each pair of lateral canals. Where relevant, watercourses are said to have run under canals by culverts (W. Bunting unpubl.; Smart 1983).

A wind-pump, supported by a steel framework, was erected to move some water into the canal system from Cottage Dyke. Cartographic evidence shows the wind-pump linked by a narrow watercourse to canal 9 of the central system, with the watercourse itself depicted as crossing the line of Cottage Dyke [4]. However, this may have been an innovation instigated by the British Moss Litter Co., rather than being a part of the original Griendtsveen plan. An illustrated advertisement for The Isle of Axholme Artesian Tube Well Co. of Doncaster (*Doncaster Gazette* 13 March 1908) stated that its “Windmill” could be seen working inter alia on the “Peat Moss Moors, Thorne”, so it might have been relatively new in 1908.

In an effort to retain water in the active canals, there is some evidence that clay was irregularly deposited in the canals in places, though again the instigator of this is not known. However, it was seemingly neither efficiently nor effectively done (Smart 1983, Smart et al. 1986, Dargie 1988). Sample cores were taken from lateral canals 1-6 of the southern system, and from the adjacent length of the main canal. Clay was detected in canals 1-3 (not 4-6) and also in the main canal. Dargie (1988) observed:

No locality [cored] conformed to the schematic portrayal of Smart *et al.* (1986). There were few rises to the sides of a canal, thickness varied considerably and at random, two or more layers were sometimes present, and material was often locally absent. The original lining was clearly done very inefficiently.

Water was also transferred into the canal network by a steam-pump at the Moorends Works (apparently peat-fired), which took it from Durham’s Warping Drain. The movement of water by the wind-pump and steam-pump was able to offset lowering water levels in the canals. Interestingly, during the fire at the Moorends Works in January 1922, the fire-brigade was able to obtain “plentiful” supplies of water from the “canal, which flows not far from the works” (*Doncaster Gazette* 20 January). However, this may perhaps have been Durham’s Warping Drain.

The fleet on the peat canals was of Dutch origin, probably constructed by Firma Weduwe Boele & Zoon, at Slikkerveer, east of Rotterdam [5]. Referred to in The Netherlands as *vletten* (flat-bottomed boats), the barges were compound craft, shipped in two halves. They were conveyed complete with bolts and spanners [6], to be put together at Thorne, after their railway journey from Goole. The vessels were transported August-November 1895 by two ships of the Goole Steam Shipping Co., the *Derwent*

(one barge) and the *Wharfe* (11 barges) [7], which maintained a bi-weekly service between Goole and Rotterdam (Drury 1955). They were described in 1899 (*Goole Times* 4 August, *Doncaster Gazette* 11 August) as “long Dutch barges introduced by the Griendtsveen Company”. The only known photograph of these vessels at Thorne is one dated c.1912, which has been published (Limbert 1986, Booth 1998, van der Sleen 2000, van de Griendt 2002).

The barges were flat-bottomed, swim-headed, iron craft (Plate 4), perhaps sometimes tarred black, with a wooden platform fore and aft for a man to stand on, wielding a boat-hook or pole. Up to six or so barges were remembered at once at the Moorends Works, with the full complement amounting to 12. They were 12m long, with a 3m beam at the base, and a height of 0.5m. Each held a maximum of perhaps six wagon-loads of peat (c.6 tons). The weight of the cargo loaded depended on the amount of peat for removal and the depth of available water. Nor was the barge necessarily filled at only one place, being moved to where the dried peat could be brought to the canal side.

When required at the Moorends Works, the turves were wheeled to the canal side and then tipped into the barge, using planks as necessary, to fill the hold. The turves were tipped into it until the load was roughly level with the top of the sides. Then, a course of tightly-packed turves, their long axes pointing inwards, was placed on those already tipped in, extending around the outside of the load and therefore level with the outer edge of the barge. Then more turves were tipped or thrown in, and another similar course was built around them, on top of the previous one, the individual turves being aligned end-over-middle in the courses. An average height above the barge sides was 3-4ft, the courses sequentially stepped inwards for greater stability. The area within this outer ‘wall’ was filled with turves tossed and tipped in.

The barges were usually operated in pairs, pulled by two horses in tandem. A short length of chain fore and aft allowed a pair of barges to be fastened together. Another chain, attached to a wooden draught-bar at the rear of the second horse, ended with a hook, which coupled it to a link of the chain at the bow of the first barge. The vessels had no rudder, and could travel in either direction without turning. It was recalled that they were guided by a worker, standing on the canal bank or barge platform, using a boat-hook or pole. This reinforces the assertions of Goodchild (1971-73) and Smart

(1983). A second man, or youth, walked with the horses. Along the lateral canals, where there were no towpaths, the barges were entirely man-powered and steered, using muscles, boat-hooks, poles and ropes.

Although it is alleged that the fleet of barges was homogenous in type, puzzlingly this does not seem to have been entirely so. It is maintained that the barges were compound boats, which could be physically divided into two halves. Their bulkheads were merely bolted together. If damaged, or needed tarring, individual barges were unbolted in the water, close to the Moorends Works, and then hand-winchd as two separate halves on to the canal bank. They were turned over on to railway sleepers for attention. This was an occasional job carried out – as required – in summer, probably by the works staff themselves. However, specialist examination of the only genuine photograph, and knowledge of Griendtsveen barges in The Netherlands [8], confirms that these at least were incapable of division [9]. Published photographs of Griendtsveen barges in The Netherlands appear in van der Sleen (1991, 2000) and van de Griendt (2002).

Once conveyed to the Moorends Works, the barges were held until they could be unloaded. Here, the canal was wide enough for the barges to be pulled past each other. The peat was unloaded by the works staff, sheltered by a wooden canopy roof erected by the Griendtsveen Moss Litter Co. They stood on the loads, and threw the turves on to a conveyor-belt which took them into the Works.

The British Moss Litter Co. inherited the Griendtsveen Moss Litter Co.'s tract of moorland, and continued the utilization of the earlier company's southern canal system. However, they did not enlarge or complete what they had succeeded to, and were seemingly unwilling to do so. As increasing exploitation caused the moors to become progressively drier, tramways benefited from this and the canal network was disadvantaged. Laying the former where they were needed was both relatively flexible and involved less expense, with the canals only able to compete where they already existed.

The fire at the Moorends Works in 1922 signalled the end of production there, and the final abandonment of barge use. The last contemporary reference to the vessels is contained in an account of the blaze in the *Doncaster Gazette* (20 January). Here, it was

reported that during fire-fighting, the captain of the fire-brigade fell into an “iron boat” and sustained injuries. Later in the decade, the vessels were sold and cut up prior to removal as scrap metal.

The canals themselves became neglected and overgrown, and the steady decline in the wider moss litter industry during the next four decades or so reinforced their abandonment.

6.3 Rail-based haulage

Narrow gauge trams were essential, and for some years were to comprise independent systems, each attached to a works. They eventually became a more integrated system under the successive British Moss Litter Companies, though still organized within individual works territories. Not until Fisons made the Swinefleet Works the only operational one, as late as 1966, did a truly unified network exist, entirely geared to serving that one surviving outlet.

In contrast to Thorne Moors, information on the Hatfield Moors narrow gauge and rolling stock in the 19th century is almost entirely lacking. There is a single reference, from the *Doncaster Chronicle* of 23 August 1889, describing the Hatfield Chase Peat Moss Litter Co. in its first year. In referring to the company’s storage stacks, it was reported that:

Tram lines pass between these stacks at convenient distances, and, as the peat is required, it is carried in bags [sic] to the trucks or bogies and conveyed along the tramway to the works, when it is run up an incline into the top storey by means of a capstan, and the squares [of peat] are passed through a tearing machine.

The located direct references to Thorne Moors tramways in the 1880s mainly originate from Bennett’s Moss Litter Co., based at the Marshland (Swinefleet) Works in the 1880s-90s [10]. It is likely to have been typical of the earliest companies. In 1886 (*Goole Times* 20 February), it was noted that:

Mr Bennett’s machinery will be completed in April, and then the works will be in full progress. Sheds are being erected, tramways laid, and every preparation made for a large output.

A few months later (*Goole Times* 4 and 11 June), it was claimed that 1.5 miles of trams “fitted with light rails, have been laid across the moor”. In September (*Goole Times* 17

September), it was observed that by means of the rails – then given as only 1 mile in length – “the turves are brought in quantities of about half a ton to the shed”, suggesting their conveyance in relatively small wagons (Limbert 2000), possibly operated singly.

The ‘Medge Hall’ moorland was apparently visited in December 1888 (*Goole Times* 23 August 1889, quoting from the *Yorkshire Post*). On it, where peat winning operations had already been carried out for several years, “were miles of tramways, upon which trams are run to bring in the peat as it is dried”. A fire at the Medge Hall Works in November 1892 destroyed sheds and “ten waggons” (*Doncaster Chronicle* 18 November), these latter presumed to be peat wagons.

The Bennett’s Moss Litter Co. also created the relatively short-lived ‘Swinefleet Tramway’, a name coined by Limbert (1990a), laid in November 1889. The *Goole Times* (8 November) observed:

Bennett’s Peat Moss Litter Company, Limited, are this week engaged in laying down a tramway from Swin[e]fleet Warping Drain end to the Marshland Peat Works. The gauge is 3ft 7in, and the length of tramway about four miles. It is intended to work it by steam power. The construction of the line will probably be completed in the course of next week.

A further report in the *Goole Times* (3 January 1890) recorded that the line had been completed, and that on 30 December 1889 “trains of waggons loaded with peat were run upon it for the first time”. It was added that although horses were then being used on it, it was eventually intended to employ a locomotive. The *Goole Times* (14 February 1890) reported later:

The locomotive, built by Messrs Webster, Jackson and Co. [11] for the Bennett Peat Moss Litter Company, yesterday [13 February] made its first journey from the Swinefleet Terminus to the Works, and appeared to work satisfactorily, at a good rate of speed.

By the end of March 1890, the Bennett’s Moss Litter Co. directors were optimistic (*Goole Times* 28 March):

a steam tramway from the works to Swin[e]fleet town end, a distance of four miles, has been laid, and is now working. This will enable the company to deliver litter on railway at Goole at less cost than heretofore, and in whatever additional quantities the trade may require.

The train itself was described in 1895 (*Goole Times, Doncaster Chronicle* 7 June) [12], when it was employed to transport members of the Yorkshire Naturalists' Union on to Thorne Moors. The Goole paper reported:

The party left Goole station about twelve o'clock, and proceeded by waggonette to Swinefleet warping drain, and thence, by permission of the manager of the Peat Moss Litter Company, by the peat "train" to the borders of the moor. The said "train" reminded one very forcibly of the days of George Stephenson, for it was very primitive indeed. The "carriages" consisted of a large square platform without sides, upon the edge of which the passengers, who were all first-class ones, were seated with their legs hanging down. The engine was perhaps even more original than the "carriages", being on the model of the old "Puffing Billy" [13]. By this "train" the passengers were enabled to get over two or three miles of land in fairly quick time, although the outside riders were somewhat shaken, and conversation was rendered rather difficult.

The *Doncaster Chronicle* added that the tramway "ends in the middle of Goole Moor, among the dried and drying peats".

The 'Swinefleet Tramway' was later inherited by Bennett's successor at the Swinefleet Works, the Goole Moss Litter Co. When the latter also ceased trading, in 1896, the works and line were leased to the British Moss Litter Co. The tramway adjoined, rather than constituted an integral part of, the moorland network, not least because of the difference in gauge. The rails of the 'Swinefleet Tramway' were single-track, except for a loop near the northern termination [14]. The tramway was used for the transportation of moss litter over solid ground from the Swinefleet Works, along the side of Swinefleet Warping Drain, to a depot near Swinefleet Clough on the River Ouse. However, the opening of the standard gauge Goole & Marshland Light Railway (later forming part of the Axholme Joint Railway) in January 1900 (Judge 1994), ended the role of the 'Swinefleet Tramway'. The former not only physically crossed the existing narrow gauge line, but also usurped and improved on its function. The new light railway had a short spur to the Swinefleet Works, thus replacing the laborious transfer of peat from the 'Swinefleet Tramway' to the Goole road or the River Ouse. The Light Railway had direct access to the national rail network.

By the 1890s, the use of wagons had become an accepted part of the entire moorland landscape. They were almost wholly muscle-powered, with three horses being stabled at each works by the British Moss Litter Co. Up to three horses pulled a single train,

harnessed in single file, walking between the rails. The peat balks supporting the permanent lines were 0.5 chain wide, and the rails were laid 'off centre'. This latter was to allow the turning of the horses when released from one haulage task, usually bringing empty wagons, so that they could then pick up a rake of full ones. However, lines for locomotives in later years were placed centrally on the balks. Although the horses were led along the permanent lines, they could not be taken on to the potentially treacherous peat workings, which were quite unsuited to horses, to haul along the temporary lines. Here, human exertion was still required to push wagons individually.

The one exception to muscle effort on the 3ft web was a steam locomotive that, regrettably, remains as enigmatic as that travelling the 'Swinefleet Tramway'. It worked from the northern edge of Goole Moor, along Earnshaw's Warping Drain, to the Old Goole Works close to the River Ouse. There was a short connection with nearby Goole Grange, where William Smith lived, suggesting shared agricultural use [15]. The Goole & Marshland Light Railway traversed this existing tramway by a "crossroads" (Judge 1994) though for only a relatively short period of time. The Works, like the Swinefleet Clough depot, along the same road, was closed within a few years. It is not known precisely when this second locomotive was used, or which company actually introduced it, though its later life was spent in the service of the British Moss Litter Co. A suggestion that the locomotive may have been constructed by John Fowler & Co. (Leeds) Ltd has not been substantiated from the locomotive works list (Jux 1985). Admittedly this source would only be relevant if the locomotive had been purchased new by its Thorne owner.

Alongside the Creyke's Sidings Works was the "charbonite mill", apparently operated by William Smith & Co., one of the concerns originally involved in moss litter. The mill was small, and said not to be particularly successful. However, since at least some of its products were peat-based, it had 3ft rails leading from the line that ran to the nearby Creyke's Sidings Works.

One of the earliest contemporary references to the Thorne Moors narrow gauge, dated to March 1894 (Bunker 1898, Limbert 1989), noted that "Trains of small trucks laden with dry turves are drawn along tramways to the mill". It was observed in 1899 (*Goole Times* 3 March) that won peat turves were stacked at the peat workings, the writer adding that

“sufficient space [is] left between the stacks to admit of the plateway for the tram trucks, which are utilised to transport the turves to the mills”. Later in 1899 (*Goole Times* 4 August, *Doncaster Gazette* 11 August), another writer recorded that “Tram lines are...laid, and by trains of trucks the peats are conveyed to the works”. The prospectus [16] of the British Moss Litter Co. of 1899 noted:

The light railways now in course of construction in the vicinity of three of the [1896] Company’s works will, when opened, increase transport facilities, and thus effect a further economy.

A brief description of the Thorne industry c.1904 (Nunn 1904) recorded that peat was “loaded on trucks on a portable line of tramway that is put down when required, of which there is altogether about thirty miles on the property”. This figure, perhaps, combined all available lengths of portable track with the permanent rails. The observation also suggests some confusion about the nature of temporary and permanent lines, unless a theoretical maximum length of temporary track available was included. By the 1950s, there was said to be c.18 miles of permanent tram, a figure that was to reduce further subsequently.

A visitor to Thorne Moors in July 1907 (Woodruffe-Peacock 1907) recorded:

On picking up the tramway, which carries the dried turves to the manufactory...The line, without much attempt at levelling, has been laid east to west right over the original peat surface, and cinders from the engine-room fire had been used as a binder to compact the [rail] road for horses’ feet.

Although only describing one stretch of permanent tram, this portrayal was probably widely applicable. All track consisted of flat-bottomed rail. The horse-worked permanent metals were 16lb and 18lb stock, but in the 1950s, with the introduction of locomotives, much of the permanent network was uprated to 25lb stock. The temporary rails may originally have been as light as 9lb or 12lb in weight, being linked to the fixed rails by turntables. Rails from any source were used on Thorne Moors.

The British Moss Litter Co. depended on trams to convey the unrefined peat destined for the Moorends Works, except when moving it from the vicinity of the canal network. In the succeeding years, there was little tram development anywhere on Thorne Moors, with minimal innovation until after World War II. This mirrored the effects of the progressive diminution in the peat market, as working horses continued to succumb to engine power.

The morphology of the very earliest peat wagons is not recorded. Two long extinct types, dated c.1896 and 1911 respectively, are documented photographically (Limbert 2000) [17]. They are shown in Plate 5. An apparent third type is actually a phantom [18]. There are two located examples of independent wagon manufacture, one in Thorne [19], the other still unknown [20]. The typical wagon of the British Moss Litter Co. may have been inherited from one of its predecessors at Thorne, possibly the Newman & Owston Moss Litter Co. or the Griendtsveen Moss Litter Co. (Limbert 2000). This type, measuring c.7ft high, 12ft long and 4ft 6in wide, had slatted sides and ends, the latter raised to maximise and stabilize the load. It was also characterized by outside frames and dumb buffers. These features can be seen in Plate 6 (upper photograph). In the 1930s, an experiment was undertaken to place extra planks along the sides of some wagons, to raise them to the height of the ends, to hold extra peat. However, this innovation was not persisted with.

Examples of the 'standard' wooden wagon of the British Moss Litter Co. may be seen in a number of published photographs (Limbert 1986, 1988, 1999 [21], Limbert 2000, Judge 1994, Booth 1998). Under this company, the wooden wagons were constructed and repaired at the Moorends Works. Only the wheels and axleboxes were purposely bought in; even the coupling chains were made at the Works. About 200 wooden wagons were used on Thorne Moors in their closing years. The last were built within the period 1948-50, except a single trial – and unsatisfactory – wagon at the Medge Hall Works. After c.1950, a contractor at the Hatfield Works (that had hitherto received wagons from the Moorends Works) was engaged to build wooden wagons. However, the skill had been lost and the few made were failures, and none was sent to Thorne or fabricated subsequently. Fisons began purchasing steel wagons from 1964.

One to three horses were harnessed to haul rakes of wagons, the number depending on the total load. Two horses were used to pull up to 12-15 wagons, and three horses could move as many as 24 if the peat was very dry and therefore light. Each wagon was intended to hold about 1 ton of peat, though the precise volume depended on the weight of contained water. It was regarded as quite difficult to get 1 ton of peat into a wagon in a very dry year.

In the post-war period, and presumably in earlier times, wagons were loaded in a specific way to ensure 1 ton in each. Turves were thrown into the wagon until they were above the level of the sides. Climbing on to the wagon, the peat worker then placed some of these turves to build up the 'back' wall (i.e. that furthest from the storage stack from which the turves were derived). This was initially three courses high (i.e. level with the wagon ends), with the turves positioned end-over-middle. The courses were successively stepped inwards for stability, each turf with its long axis facing inwards. More turves were thrown into the wagon, and from these the wagon ends (i.e. higher than the sides) were built up three courses high, again with their long axes pointing inwards. The 'back' wall was completed in a similar way, the latter being thus six courses high, stepped inwards. More turves were then thrown on to the load. Next, the front wall was built up to a height of six turves, again stepped inwards, but derived from turves in the stack immediately adjacent. Finally, the whole load was "rounded over" with additional turves, before being taken away. Less peat was put on the wagon if it was not adequately dried and therefore weighed more. It was then simply thrown on, to the height of the wagon ends, and also "rounded over".

Some wagon chassis or underframes were constructed, known as "flat wagons". These were employed to carry people, stacked rails [22], tanks and other items.

6.4 The introduction of locomotives

Reginald Dickinson (1893-1965), based at the Moorends Works, became the blacksmith/joiner for the British Moss Litter Co. He built wooden wagons, but also began the process of mechanisation on the narrow gauge. In 1947 he converted for rail use an Austin Seven car, with Swallow coachwork likely to have been the saloon version [23] (Limbert & Roworth 2009). This he intended to run on the tram network, mounted on a wooden wagon underframe. It was used for hauling wagons, which it did for three or four years, but became regarded as unsuccessful. Its 7.8hp petrol engine was considered to be underpowered for the job. Nevertheless, the Foreman at the Swinefleet Works used this 'Railway Seven' – as such conversions became known – to transport him and his works crew on flat wagons across the moors to the Creykes Sidings Works, and probably elsewhere on the system. This only lasted for a year or so, and the use of the 'Railway Seven' after the early 1950s is unknown. It was also said to have taken the company directors on a tour. At first, the 'Railway Seven' was based at

the Moorends Works (kept as a depot and a blacksmith's/joiner's shop), but was later held at the Swinefleet Works (Limbert & Roworth 2009). It still survived at the latter in 1960, though by then in a derelict state (Industrial Railway Society *Bulletin* 55: 7).

In 1954 or 1955 (Limbert & Roworth 2009), a locomotive manufactured by James & Frederick Howard Ltd of Bedford was introduced by the British Moss Litter Co. alongside the horses, for taking laden wagons to the Swinefleet Works, where it was based. Although initially having a 31hp petrol-driven engine, the locomotive was later converted to diesel power, but had a short life in this condition [24], being scrapped in 1959.

The Howard locomotive was an H type, as described by Webb (1967, 1973). Howard marketed a range of petrol locomotives from c.1923-31, their narrow gauge designs being named types S and H, with the latter the more powerful and larger. They were "most robust machines incorporating as did all the Howard locos a massive open box type steel frame" (Webb 1967), that must have discouraged regauging. Examples were supplied to brickworks, cement manufacturers and contractors in the UK, with a small number also exported. At Thorne, there are probably three Howard candidates. Two were offered for sale in 1947 by the Milton Hall (Southend) Brick Co. They were works numbers 939 (ex-works to Milton Hall in 1928) and 964 (1929). Both were advertised in *The Machinery Market* of 15 August 1947. They were apparently purchased by Middlesex Contractors Plant Ltd, of London, as this firm was offering for sale two Howard 3ft gauge locomotives in 1948 (*The Contract Journal and Specification Record* 28 January, 8 September; *The Machinery Market* 20 March). The third Howard locomotive, works number 977, was a 3ft gauge locomotive ex-works in 1930, sent to Judkins Ltd of Nuneaton. This locomotive was advertised by Judkins in 1949 (*The Contract Journal and Specification Record* 10 August), and sold to a Cardiff dealer, Oswald Bond, in that year. Any of these could have been bought from a specialist dealer by the British Moss Litter Co., though Booth (1998) favoured works number 977.

Little local information on this locomotive has persisted. It was bought via Belton Bros & Drury Ltd, agricultural engineers of Eastoft, from an unknown quarry, and was 3ft gauge. When owned by the British Moss Litter Co., a makeshift cab was constructed

for it (see Plate 6, lower photograph). The original petrol engine was converted to diesel by Belton Bros & Drury Ltd. When scrapped in 1959, the locomotive was sent to Alfred Oglesby, a Swinefleet scrap dealer. Judge (1994) incorrectly gives the year of scrapping as 1960. He also writes that the locomotive was “purchased from a quarry around 1951”. Booth (1998) states that it came “from a quarry company who had used it from about 1949”.

In 1959, the British Moss Litter Co. initiated the use of class LBT locomotives from Ruston & Hornsby Ltd of Lincoln, and this presaged a steady process of dieselisation. These locomotives were capable of developing 31hp, and once they became operational and proved themselves, the need for horses ceased, and by 1960 they were entirely replaced. When Fisons took control of the British Moss Litter Co., some interchange of locomotives between Thorne and Hatfield Moors was commenced.

Following the Howard, diesel-mechanical locomotives were obtained, beginning with two RH locomotives (Limbert & Roworth 2009). The first was 432661/59, later named SIMBA [25], followed by 432665/59 (TANIA). The former was based at the Swinefleet Works, with 432665 also apparently at Swinefleet first, but then became the only locomotive to be kept at the Medge Hall Works. The rails on the Medge Hall territory (south of Mill Drain) had not been replaced by heavier ones for locomotive use, so 432665, intriguingly said to be a lighter type, was felt to be the most appropriate for these metals. All other main-line locomotives were headquartered (in the open) at the Swinefleet Works, including 432665 from 1966 [26].

During the years following Fisons’ purchase of the British Moss Litter Co., further locomotives were obtained, both new and second-hand. By the end of commercial operations, under The Scotts Co. (UK) Ltd, the total of narrow-gauge motive units present at some time on the site had amounted to 22 (Limbert & Roworth 2009). Both 432661 and 432665 eventually entered the world of private railway preservation (Limbert & Roworth 2009).

During the locomotive years at least, rails from any source were used on Thorne Moors, and not necessarily 3ft gauge, with widths as narrow as 2ft being modified. For example, rails were obtained from as near as North Moor Farm, situated south-east of

Thorne Moors, between Belton and Ealand. This was a 2ft gauge horse-worked system ceasing c.1953. The rails were surplus portable track of World War I date and in a poor state. The track was lifted in 1958 by the British Moss Litter Co., and used to repair the networks on both Thorne and Hatfield Moors (Squires 1987, Ashforth et al. 2010). Other rails were taken from the British Moss Litter Co.'s Risley Moss site. This moss was situated near Warrington, and was a 2ft gauge layout. The rails were said to have been removed in the 1950s, but it was probably in the early 1960s when much track was lifted (Hall et al. 2001).

6.5 Notes

[1] To obtain an accurate visual overview of the canal network, large scale maps are essential. The canals are most clearly represented on the Ordnance Survey 25in scale County Series Yorkshire (West Riding) sheets 252/14-15, 266/3-4, revised 1904 and published 1906. Derived from the 25in maps are the 6in scale County Series Yorkshire (West Riding) Quarter Sheets 252SE (revised 1904, second edition published 1907) and 266NE (revised 1904-06, second edition published 1908)

[2] Goodchild (1971-73) observed that when the Moorends Works was rebuilt in 1895, the accounts record payments for the extensive brickwork (over 2500cu. yd) required for the aqueduct. The cost of the ironwork was not mentioned

[3] The lines on the large scale maps, marking these out, are presumably drainage slits/trenches

[4] Its position was at grid reference SE736154. It is marked on sheets 266/4 and 266NE (note 1)

[5] This information is from H.F. van de Griendt (in litt.), based on family archives

[6] A letter from J.F. van de Griendt to E. van de Griendt, dated 20 May 1895, gives details (per H.F. van de Griendt)

[7] From the Griendtsveen Moss Litter Co./British Moss Litter Co. 'Day Book' 1894-99, referenced DY.BML 2/3, held at Doncaster Archives

[8] H.F. van de Griendt (in litt. and pers. comm.)

[9] In particular, the Thorne barge shows no sign of a discontinuity in the line of the hull, and the cross-member over where the bisection presumably happened similarly has no line across it. This cross-member seems to be of about the same thickness as the others, only differing from them in that iron plates were fitted to it to act as a divider of the cargo space. Thus the solid bulkhead in the centre is clearly

single plate, with no possibility of the barge being capable of division into two parts (J.H. Boyes, M. Taylor in litt.)

[10] There are, however, apparent references to rails being employed for specialist use by the Moss Litter, Charcoal & Manure Co., based at the Medge Hall Works. The *Goole Times* of 22 January 1886 gives a description of the company's manufacture of peat charcoal, observing:

Blocks of peat are loaded on iron trucks or waggons, which are run into brick-arched chambers, the carbonisation being effected by means of superheated steam driven through the ovens...The peat on being withdrawn from the charring ovens, is run into cooling chambers

In the *Goole Times* of 23 August 1889, a similar description noted that "a tramcar loaded [is] run into the furnace and out again...It is then passed into a cooling place"

[11] Engineers and ironfounders of Goole, later Webster & Bickerton. In a published description of the company (*Goole Times* 10 November 1893), it was observed that the locomotive was "the only one that has been made in Goole"

[12] The 'Goole' version was reproduced in 1989 in the *Bulletin of the Yorkshire Naturalists' Union* (**11**: 9-11; **12**: 24-26)

[13] A photograph of the locomotive once existed, but the only known print was destroyed years ago (S. Oughtibridge pers. comm.). It was said to have depicted a locomotive that was not vertical boilered, had four wheels, and was powered by a ship's steam engine. Perhaps significantly, H.T. Bennett's business connections included the Bennett Steamship Co. and other shipping (*Goole Times*, 19 September 1919). All that can be deduced from the allusion to 'Puffing Billy' is that the locomotive was primitive, though it presumably reinforces the statement regarding the boiler. 'Puffing Billy' was built in 1813, and is now in the Science Museum

[14] This is shown on a plan entitled 'Plan of Peat Shed, Clough Head, etc., Swinefleet. Henry Bell Thorp, Architect and Surveyor, Goole', dated October 1897. It is held at Doncaster Archives, referenced DY.BML 4/14. Redrawn in Limbert (1990b)

[15] Further examples are known of convergence with agricultural interests. Wooden peat wagons were occasionally made available to farmers for conveying potatoes in difficult circumstances, though they were required to use their own horses. Two instances from the 1930s may be cited in illustration. In one winter, in the vicinity of the Swinefleet Works, flat bogies were rented to a farmer, who used them on the narrow gauge to transport potatoes when conditions were too wet for horses and carts. Similarly, at Medge Hall, in a wet season before World War II, it was difficult to transport potatoes from the fields between the Pony Bridge and Medge Hall. Thus, access to the tram on the bank from the bridge to the works was allowed to the farmer to get his crop to Medge Hall

[16] A photocopy of the prospectus is held at Doncaster Archives, in the J.S. Taylor papers, referenced DZ.Tay 3/1

[17] The original sources are as follows, excluding modern ephemera:

Version dated 1896

Hartley & Ingilby (1988): photograph 153, the image appears in reverse

Booth (1998): p.69

Tuffrey (1999): p.111

Limbert (2000): p.376

Version dated 1911

This image was issued as one in a series of postcards by the Regina Co., press photographers of Doncaster. It also appeared in the Sheffield-based *The Picture Paper* of 21 April 1911.

Tuffrey (1999): p.110

Limbert (2000): p.377

van der Sleen (2000): p.26 (lower)

Ellis (2006): Plate 35

[18] What appears to be a third type of wagon, from another manufacturer, is visible in a plate in Brierley (1900). In the plate, captioned 'On the canal: a Dutch crew', a wagon with sloping sides is evident. The view purports to be local. However, this is not so, as the image is an imported Dutch scene

[19] The first predates 1893, and involved Stones Bros, of the Fieldside Foundry in Thorne. The G.W. Thompson archive at Doncaster Museum & Art Gallery (unaccessioned) contains a copy of their auction catalogue:

TO BE SOLD BY AUCTION (WITHOUT RESERVE), by Messrs. WALLER & TOMLINSON JOINTLY WITH MR. A.S. GLASIER, On the premises of Messrs. STONES BROS., as above, on Thursday & Friday, March 16 & 17, THE WHOLE OF THE WORKING PLANT, Tools, Patterns, &c., Used in carrying on the above works.

It is dated March 1893, printed by W. Wrigley, Thorne. The catalogue announced that the contents of the blacksmith's shop included "8 pairs of Couplings for Peat Waggon" and "Shafts and Pedestals for Peat Waggon". Also less certain items like "10 Metal Wheels (various)". Unfortunately, it is not recorded which peat company was involved

[20] A 1905 reference to "12 Moors Wagons for Medge Hall as per Contract" is given by Goodchild (1971-73)

[21] These were on Hatfield Moors, but would have been fabricated at the Moorends Works

[22] An underframe with a length of portable track is depicted in the 1911 photograph detailed in note 17. See Plate 5, lower photograph

[23] Austin Seven chasses were sold to coachbuilders for them to put their own bodies on. William Lyons built his Swallow saloon and open two-seater aluminium bodies on the chasses during 1929-32 (A. Neale in litt.)

[24] See, with photograph taken in 1957, Limbert (1988), Judge (1994) and Booth (1998). Also Limbert (1990) and Darvill (1991)

[25] These two locomotives, and a third transferred later, were named by the Swinefleet Works fitters, who physically applied the bold, upstanding letters. Claims that the locomotives were named by an early loco driver with an interest in circuses, recalling performing lions and even tigers, are apparently based on a myth. It has, however, proved impossible to determine the inspiration for the names

[26] There are no very early photographs of 432661 and 432665. For details of later images, refer to Limbert and Roworth (2009)