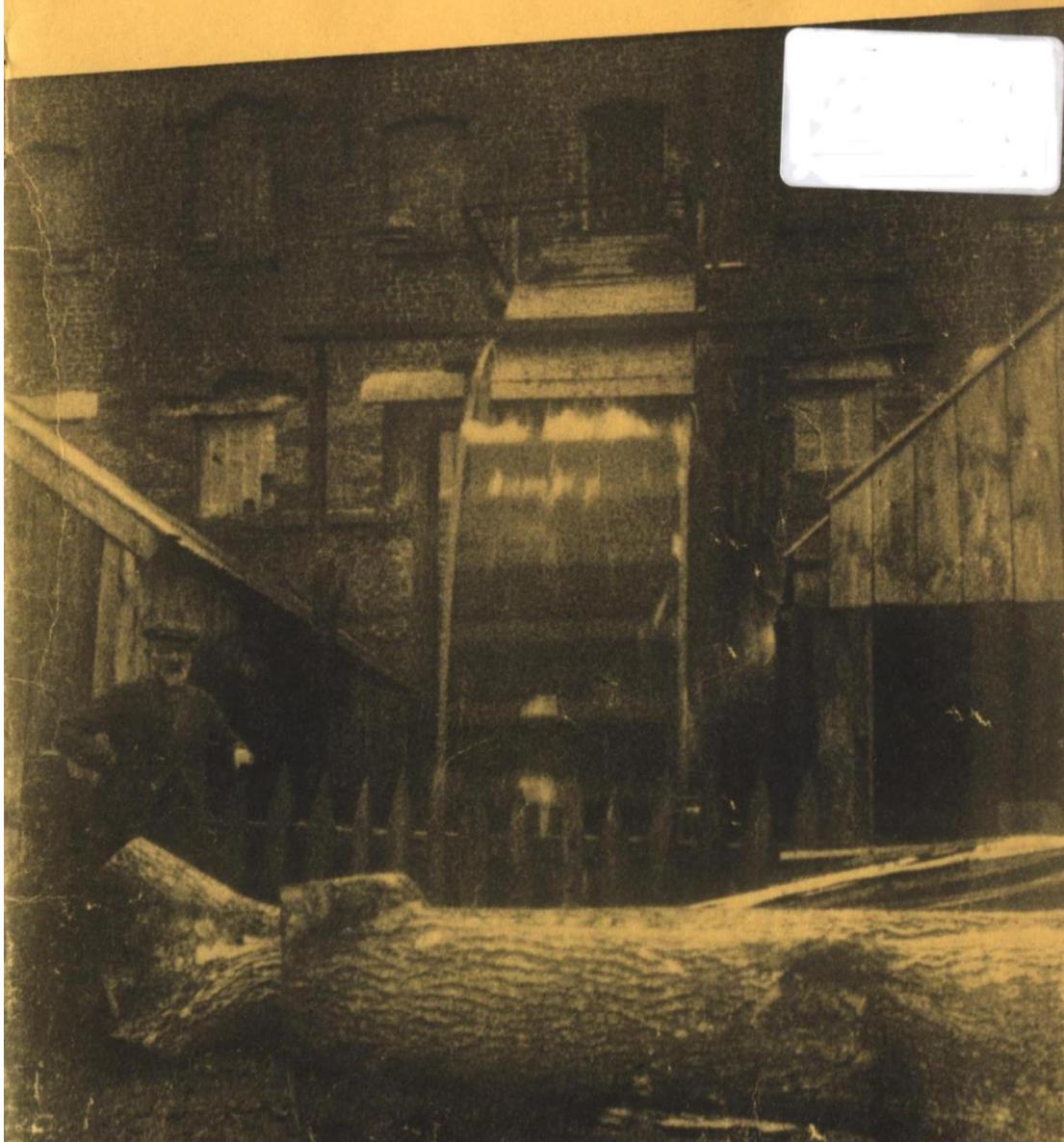




# Wheels of Wood - Wheels of Iron

A History of the Machinery  
at the Mill Complex





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# **Wheels of Wood**

## **- Wheels of Iron**

A History of the Machinery at  
the Mill Complex

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### **List of Photographs circa 1920s**

Front cover, Upper mill-  
overshot waterwheel  
Back cover, view of mill complex  
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showing water powered  
belt driven machinery

## **ACKNOWLEDGEMENTS**

Were I to mention individually all those who, in one way or another, were involved in the restoration of the Mill Complex Water Power System, the list would run to several pages. In the interests of Brevity, therefore, their collective enthusiasm must be acknowledged.

Particular mention must be made to the late Mrs. Elizabeth Murray-Usher of Cally OBE. for her foresight in proposing the creation of the "Mill on the Fleet" and to Mr John Henderson RIBA.,FRICAS. former Director of Property Services and Mr Gordon Mann MRTPI, Director of Planning, Dumfries and Galloway Regional Council who's collective enthusiasm, energy and drive made possible the resurrection of water power in Gatehouse of Fleet.

**Charlie Girdwood March 1992**

## **Introduction**

Gatehouse of Fleet Village was established circa. 1760 by James Murray of Broughton and Cally.

The Village grew steadily and by 1785 the population had increased to the point where some form of industry was required to maintain the prosperity of the area.

In 1785 James Murray granted a lease to Messrs. Birtwhistle for a site on the East Bank of the River Fleet, immediately upstream of the Fleet Bridge, for the erection of a cotton spinning mill,

By 1788 business had increased to a point where further accommodation was required. The Birtwhistles obtained finance for the construction of a second, smaller mill. The smaller mill has now been restored as “The Mill on the Fleet”.

Further mills were soon established in the village. In 1789 a third mill was erected adjacent to the Birtwhistle Site for a Mr. McWilliam. In 1790 Thomas Scott & Co. built a fourth mill at the north-east side of the Village and in 1791 John Papple, a Gatehouse Surgeon, and his brother in

law, John Smith, established a fifth mill on a 100 x 150ft site, possibly located adjacent to the present Girthon Parish Church, at a feu cost of £1, 102. The five cotton spinning mills probably obtained their bobbins from the “Barlay Bobbin Mill”, at one time located on the Mill Lade upstream of the Barlay Corn Mill.

The prime requirement for efficient operation of the mills, and other industries in Gatehouse, such as tanning, brewing and brass founding, was WATER POWER.

## **The Lade systems**

Prior to the establishment of the Village, water power had been in use in the area.

Circa. 1700 two grain mills are known to have been operational to the north of the village by the present Laurieston Road. These mills, then known as “Miln of Barlae” and “Fleuchlarg” were driven by water obtained from the Barlay Burn. This water was diverted from the burn upstream of Loch Lee Bridge on the present Laurieston Road, “Loch Lee” probably being the name given to the mill pond then located at that

point. From here a lade ran to the Barlay Mill with an off-shot to Fleuchlarg Mill. The water used by Fleuchlarg Mill was returned to the Barlay Burn. The water used by Barlay Mill was probably conducted to the River Fleet via a lade which ran to the east side of the old road leading from the village to Barlay Mill. This water entered the river upstream of the present "Mill on the Fleet" site, below the bend in the river known as "Ditches Pool".

At one time a weir was constructed across the river at this point with a sluice and lade (still discernible) by the east bank of the river running toward the present "Mill on the Fleet" site. The date and purpose of this lade is not known, it may have been constructed to supply Mr. McWilliams Mill or alternatively may have been an early attempt to provide water power to the Birtwhistle Mill site which subsequently proved to be insufficient for cotton spinning power requirements.

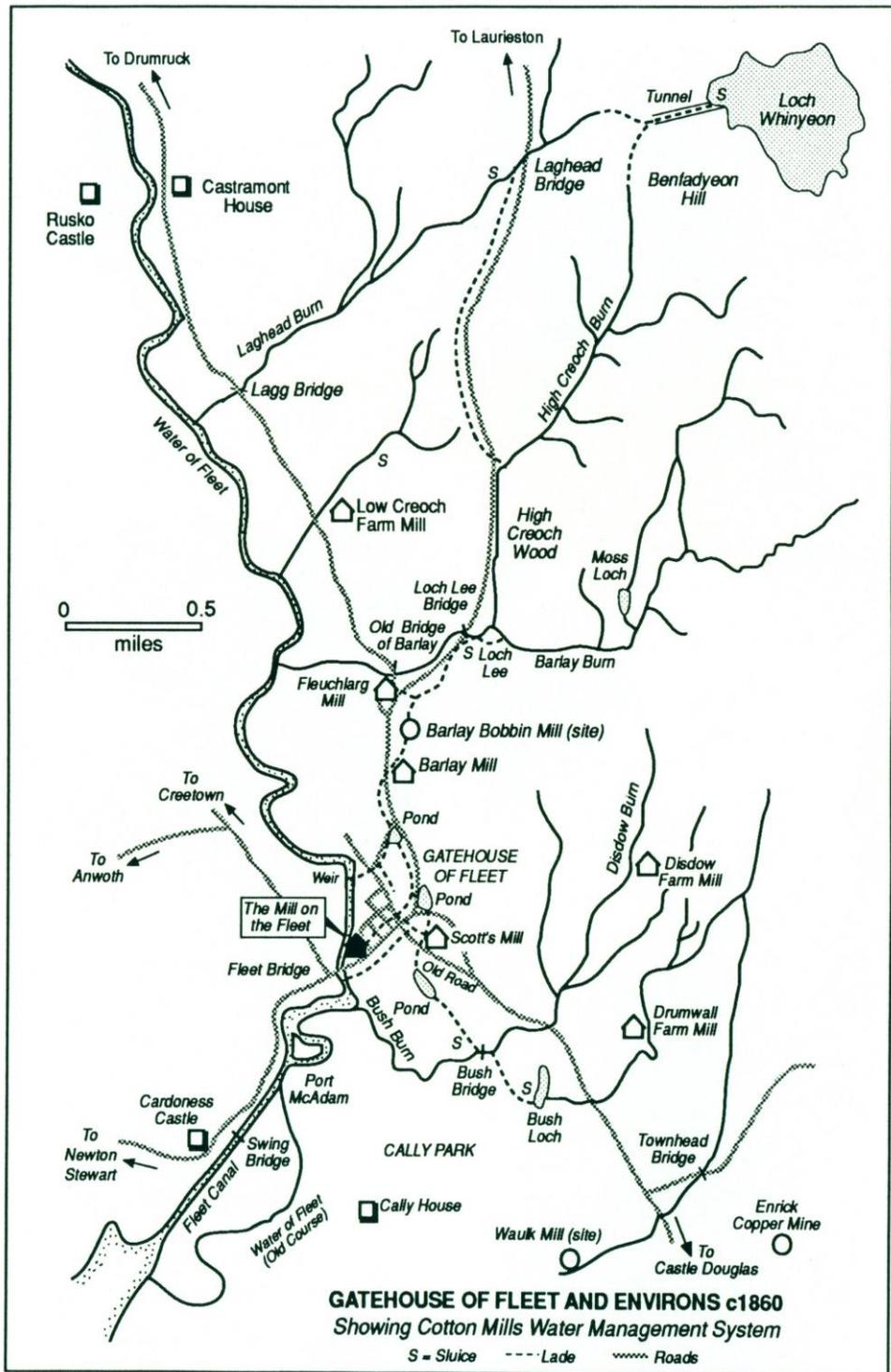
In 1785, James Murray entered into a contract with a miner, James Thomson, to construct an embankment and lade system from Loch

Whinyeon to the village, at a cost of some £1,400. The necessary works were completed by 1787.

The lade system from Loch Whinyeon to the Birtwhistle Mills site was a considerable undertaking, the loch being some 220m above sea level at a distance of some 6.4km from the mill site, which is virtually at sea level.

At Loch Whinyeon a drift (tunnel) was driven, from the south-west bank of the loch, through the hillside for some 500m, three vertical shafts being excavated on route for the removal of tunnel spoil. An earth embankment was thrown up at the south end of the loch to raise the water level, a sluice being installed at the tunnel entrance to control water flow.

From the tunnel exit water was conducted toward the high Creoch Burn by two routes. Firstly, a lade was formed, following the contours of Benfadyeon Hill for some 1.5km to intercept the headwaters of the High Creoch Burn. Secondly, water was permitted to flow down Loch Whinyeon Burn to Laghead Bridge on "Lochenbreck Trust", the



present Laurieston Road. By the bridge a sluice diverted water into a lade which ran to the west side of the present road, passing under same at a point opposite High Creoch Farm, and joining the High Creoch Burn. The combined water then flowed down through High Creoch Wood to intercept the Barlay Burn above Loch Lee Bridge. The Barlay Burn was also supplemented by water from Moss Loch, adjacent to High Barlay Farm, and its feeder streams.

The combined waters from Loch Whinyeon, High Creoch Burn and Barlay Burn were diverted by a weir and sluice, via Barlay Mill, towards the head of the village, probably taking the same route as the earlier Barlay Mill Lade.

At a point opposite the present golf course car park, where the Old Barlay Mill Road meets the “new” Laurieston Road, a mill pond was formed. From this pond a lade, probably the original outfall from Barlay Mill, ran towards the River Fleet, following the line of the old road. An off-shoot from this lade ran towards the present Fleet Farm adjacent to Girthon Parish Church.

The main lade continued, parallel to the present Laurieston Road, to a large mill pond and dam at the head of the village. The centre of the pond would approximate to the site of the present war memorial. The large mill pond was also supplied with water from the east of the village. The waters of Bush Loch, supplied by the Drum Burn and its feeder streams, were conducted by a lade running towards the Disdow or Bush Burn intercepting this burn immediately above Bush Bridge in Cally Woods.

Immediately below the bridge a weir and sluice diverted the water into a further lade which ran to Scotts Mill, via a Mill Pond located above Cushat Wood, before discharging into the main Mill Pond.

In 1820 James Murray’s son, Alexander, financed the construction of a new road round Cally Estate Woodlands, this to replace the Old Military Road which ran through the Estate, entering the Village by Ann Street. The new road, known locally as “The Cut”, enters the village from the north and bisected the large mill pond, forming two smaller ponds, interconnected under the road.

From the east pond, a minor lade ran to the east of the Village. Down through Garries Wood to the River Fleet, this lade supplied a small brewery located by the present Masonic Arms, and a Tannery, established circa 1763 at the foot of the High Street by the present Angel Hotel.

The main lade also ran from the East Pond, crossing under the High Street to a point adjacent to Girthon Parish Church, it then passed under Church Street, running down the west side of the village, parallel to the High Street, to the Birtwhistle Mills site. On route, this lade probably supplied a brass foundry, an off-shoot also supplied a small water wheel located on the west wall of the brewery building adjacent to the present “Mill on the Fleet” site.

The initial use of water power for the cotton industry was to be short-lived, in 1795 Pape and Smith were faced with sequestration. In that year some 500 persons were employed in the Gatehouse Cotton Mills and a charter was granted for the foundation of the village as “The Burgh of Barony of

Fleet”, but by 1800 the Gatehouse Cotton Industry was in decline, facing fierce competition from larger, steam powered mills in central Scotland and the north of England. The fate of Mr. McWilliam’s Mill is unknown. Scotts Mill ceased production circa 1800, subsequently being used as a saw mill. Birtwhistle Mills ceased production in 1810.

### **Early Cotton Spinning**

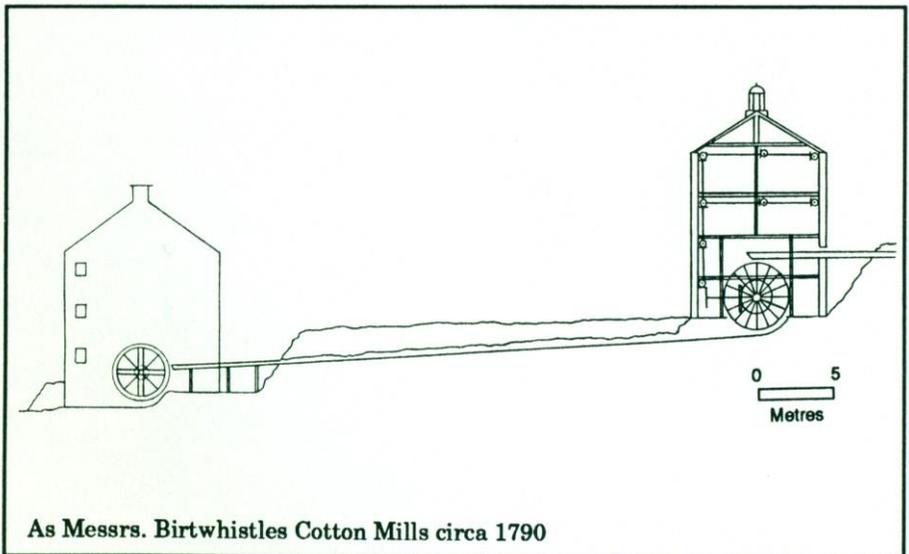
1787 . 1810

The construction and form of the water wheels installed c1787, when the buildings were first erected for Messrs. Birtwhistle, is a matter of some conjecture. At this time the use of cast iron for the construction of water wheels and mill gearing was in its infancy, John Smeaton having first used a cast iron wheel shaft at Carron Ironworks, Falkirk in 1779. Prior to this, in the early 1700’s, cast iron gears with wooden teeth had been used and some engineers had used cast iron segments bolted to the face of wooden wheels, but the first “all iron” wheels did not come into use until the early 1800’s. Prior to 1770 mill gearing was of the traditional wooden “cog and rung” type. Thereafter a gradual change to cast iron

shafts and gear wheels with “straight- cut” cycloidal teeth took place. “Bevelled work”, i.e. the transmission of power at an angle by means of cast iron gear wheels with bevelled faces, is attributed to a Mr. Kelly, engineer at David Dales cotton mills at New Lanark c1785.

It is likely that the original water wheels at Gatehouse were of timber construction, having wooden axletree, spokes, rims and paddles. Much of the internal gearing would also be of timber construction, the use of cast iron being limited to shafting, small straight-cut gear wheels and belt-drive pulleys.

These early water wheels would be of modest size and power output. The overshot wheel for the upper mill was probably located within the building, the lower mill wheel being an undershot or low breastshot type. Power use at this time would be limited to the spinning process, weaving being carried out both at the mill and by out-workers using hand looms. The warm, humid conditions required for the preparation and spinning of cotton would initially be provided by open fire grates located at either end of each floor. It is possible that some form of steam boiler plant and distribution pipework was introduced in the latter part of this period.

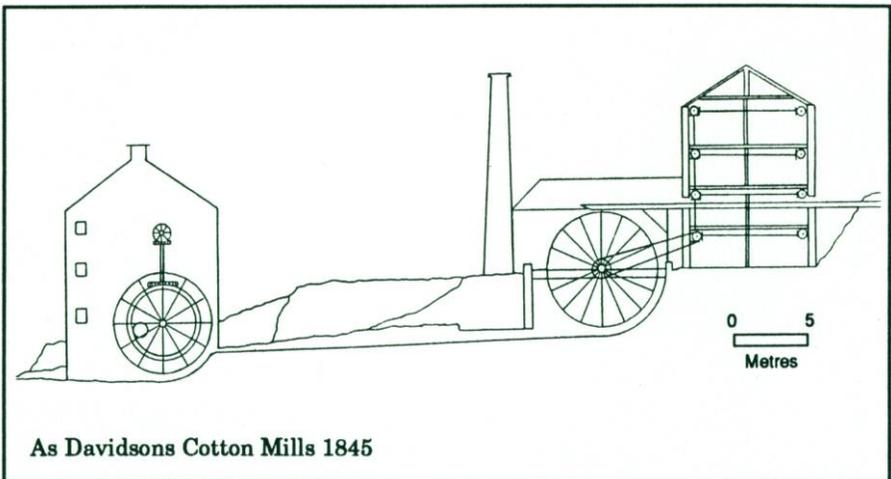


## Later Cotton Spinning and Weaving 1832 - 1850

In 1832, after being un-used for some 22 years, the buildings were refurbished and equipped with new machinery, including some 74 power looms, for James Davidson & Co. Further rebuilding and replacement of equipment was carried out following a severe fire in the upper 4 sthrey mill in 1840. The increased use of machinery would, in turn, require additional power. The water wheels, gearing etc. existing in the mills at the time of their previous closure would have been removed and replaced by “up-to-date” cast iron equipment. The upper mill was powered by a 25 ft. diameter, 8 ft. broad overshot water wheel, now located in

an external wheel pit, the lower mill having 22 ft. diameter, 8 ft. broad undershot (or low breastshot) wheel located in a similar position to the earlier wheel.

A picture of the mills, which appears in several publications, entitled “Cotton Mills, Gatehouse of Fleet, c1847” clearly illustrates the size and position of the water wheels, but, from detailing of the upper mill roof belfry and front wall buttressing, probably represents the appearance of the mills prior to the fire in 1840. The “factory return” for 1839 records the total power output for the two wheels to be some 55 H.P. At the time of the mill refurbishment, 1832 - 1840, steam boiler plant



pipework for heating of spinning rooms etc. would be installed, the maintenance of warm, humid conditions conducive of trouble-free spinning being increasingly important due to the higher speed of the spinning machinery. The boiler plant was probably housed in a building located to the left of the upper mill. There is no evidence of steam having been used to power machinery in this period but the steam plant would have been capable of such use.

Following the closure of the cotton mill c1850, the plant and machinery lay idle for some years. In May 1858 an auction sale of mill machinery, plant and equipment was held at Gatehouse mills by Mr. Wheatley Kirk, a Leeds auctioneer. The catalogue for this sale lists in great detail the machinery etc. in use at the mills immediately prior to their closure,

Power transmission equipment included some 1270 feet of wrought-iron shafts, ranging in diameter from 1 3/4 to 4 3/4 inches, together with some 100 bevelled gear wheels and some 155 pulleys. Machinery

included 156 power looms by Sharp, Roberts & Co. of Manchester and Houldsworth & Co. of Glasgow. Cast iron steam piping, serving the preparation, spinning and weaving rooms, ran to some 786 feet, and ranged in diameter from 3 to 5 1/2 inches. Also listed is a 22 ft. diameter, 8 ft. broad cast iron undershot water wheel and fittings. This we must assume to be the wheel from the lower three storey mill (now restored), probably dismantled prior to the sale. Curiously, no mention is made of the upper mill overshot wheel or the steam boiler plant. It is assumed, therefore, that they remained in situ following the sale.

Given the relationship between the earlier wheel's axle hole and the river level, it is unlikely that the axle hole was used for the 22 ft. diameter wheel from the lower mill. Prior to refurbishment there was evidence on the gable wall of the lower mill of a bearing plate located slightly higher and to the right of the axle hole, together with a further bearing at a higher level, this probably for transmission of power through the gable wall to distribution shafts within the mill.

## **Transport and Trade**

Gatehouse in the late 18th century was far from the recognised centres of trade and industry. When the Birtwhistles commenced the spinning and hand weaving cotton of in 1787 communications by road were poor. The raw cotton from America and India would be transferred from ocean-going ships at major ports and transported to Gatehouse by smaller coastal vessels. Despite improvements to the road network in the early 19<sup>th</sup> century the sea routes from the Solway to the west coast ports remained the easiest from of transport both for raw materials and completed cotton cloth

With the growth in size of sea-going vessels Alexander Murray realised the need for improvements of navigation in the River Fleet and improved docking facilities close by the village of Gatehouse. In 1824 he oversaw the canalisation of the River Fleet from the sea to Boat Green, 2 miles up river, where a harbour was formed to handle large sea-going vessels. In 1837 Port McAdam was formed downstream of Boat Green to handle larger vessels of up to 300 tons.

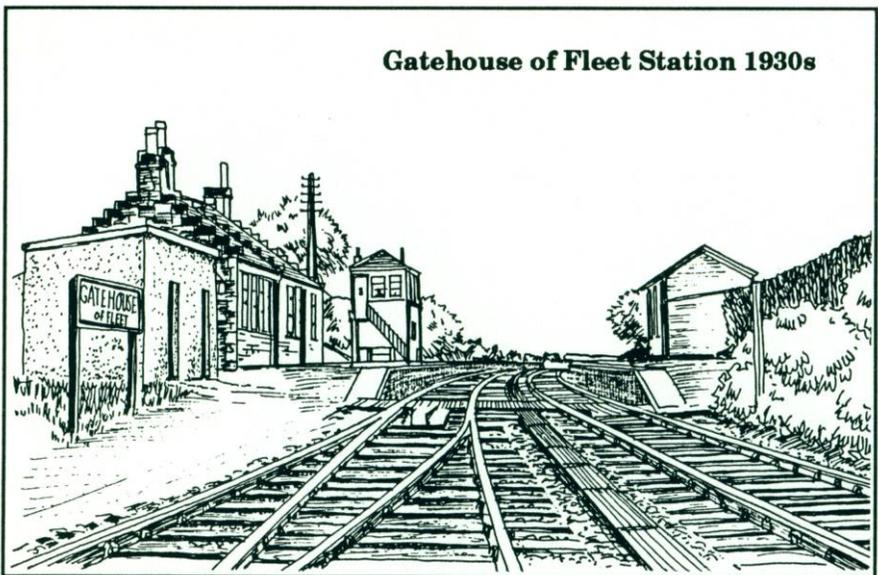
The improved shipping facilities provided by these works obviously encouraged James Davidson to re-open the cotton mills in 1832. The canal remained in regular use until the late 19th century and was doubtless used for the export of bobbins and bark prior to the coming of the railway.

The Portpatrick railway, promoted c1856 and opened between Stranraer and Castle Douglas on 11 March 1861, passed Gatehouse on an inland route some 6 miles away from, and 495 ft. above, the village, this route being chosen despite a controversy that arose in 1858 regarding the failure of the line to serve, the towns of Kirkcudbright and Gatehouse by following an inland, as opposed to coastal, route. The proposers of the coastal route were faced with the fact that it was estimated to cost £70,000 more than the inland route. At the company's second ordinary meeting on 26 February 1858, the motion in favour of the coastal route was defeated. The Vice-Chairman, Sir William Dunbar, is quoted as saying "though we cannot go to Gatehouse and Kirkcudbright, they can soon come to us". The station for

Gatehouse, Dromore, was opened in September 1861 and by 1864 the railway company was paying Robert Daizziell of Gatehouse £40 a year in guarantee for his twice daily horse bus to and from Dromore Station. Some parties blamed the railway's by-passing Gatehouse on Mr. Murray Stewart of Cally, a director of the company, and other local lairds, who wanted to prevent disturbance to their estates. This may or may not be true but when the railway was built there was not an adequate road to link Gatehouse and Dromore Station and after a plea by Mr. Murray Stewart, the directors agreed to pay one-sixth of the cost of making a road, up to a maximum of £100.

In 1896 the Government passed the Light Railways Act. In 1905 a light railway was projected to connect the Portpatrick and Wigtownshire railway at Dromore with the town of Gatehouse. Nothing came of this proposal. In 1912 James Campbell, proprietor since 1903 of the horse-drawn buses between Dromore Station and Gatehouse, approached the railway company for financial help for the purchase of a motor bus but the request was declined.

Between 1861 and 1938 the railway must have played a large part in the transport of bobbins to the large mills that had previously strangled the Gatehouse cotton trade.



## **Timber, Bobbins and Bark 1859 - 1938**

c.1859 the mill complex was acquired by Thomas & William Helme, who at that time were already established as timber merchants and textile bobbin manufacturers in Dalbeattie. The upper mill was used for the manufacture of bobbins, power for the turning lathes and other machinery being obtained from the external overshot waterwheel, transmitted by overhead shafts, pulleys and drive belts as previously used for cotton machinery. The lower mill was used as a store and bark mill. The processing of bark, predominantly oak, for leather tanning, at one time a thriving industry in Gatehouse, required modest power input. This was probably provided by a smaller, breast shot water wheel located in the position of the original lower mill wheel. There is evidence of an axle having turned on the lower granite surround of the axle hole, a considerable wear mark being visible. Following milling the bark required to be dried in a kiln to render it down to the consistency of tobacco. The heat for this process was presumably obtained from the existing boiler plant. Steam may also

have been used for the cleaning of completed bobbins. Over the earlier part of this period steam was probably obtained from the original boilerhouse, as previously stated, located to the left of the upper mill. There is again no evidence of steam being used to power machinery at this time. There is evidence on site of a, presumably later, brick chimney base and boiler firing hearth located in the banking between the mill buildings.

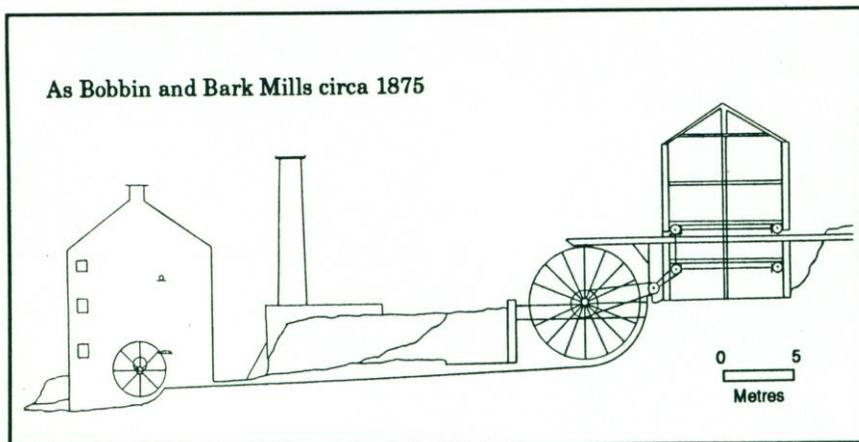
A photograph of the site, which appears in certain publications, entitled “The Bobbin Mill, circa 1850”, but which probably dates later in the 1800’s, clearly shows the lower mill to be a roofless ruin, the upper mill overshot water wheel flanked by iron roofed saw bench sheds, in operation, and the upper floors rebuilt in brickwork following the fire in 1840, with the windows now blocked up. In the centre of the photograph the hipped roof building, on close examination of the shaded wall facing the water wheel, a gothic style, pointed, multi-paned window is discernible. This was a typical characteristic of early steam boiler or engine houses. Also apparent on the gable

wall, above the sliding door, is new brickwork, presumably the position of an earlier chimney stack.

In November 1919 (see Background Research) the upper mill was again severely damaged by fire and was subsequently demolished to first floor level and refurbished c1920 as a single storey building with steel roof trusses and iron roof. On or about this time various other changes took place on the site. The hipped roof boilerhouse building was demolished and on its site was erected a bobbin drying kiln, presumably with steam boiler plant. A large steel chimney for this plant is evident on photographs of the mill in its single storey form. The 25 ft. overshot water wheel was replaced by one of smaller diameter and width,

this evidenced by a fall in the incoming overhead lade immediately above the site and by heavy timber framework and bearing bolts existing within the wheelpit.

From discussions with elderly Gatehouse residents it would appear that the lower mill, a roofless ruin in the late 1800's, was at least partially refurbished in the early 1900's, being re-roofed in iron, upper floor replaced and external stairway erected on the west gable, the upper floor being used for carpet bowling at some time. In the late 1800's a gas supply was available for lighting etc., at a later date electricity was introduced to the site and is apparent in photographs of the interior of the upper mill in its post 1920 form. (See Background Research).



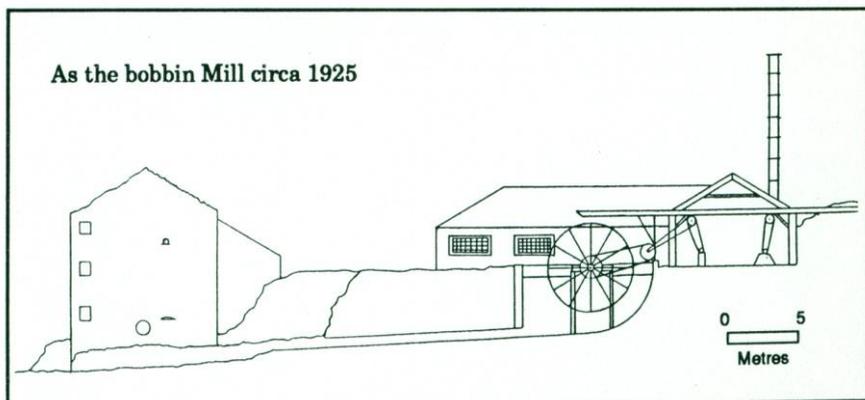
On removal of the ivy covering the lower mill building, brackets and insulators for an early overhead line supply were revealed. "Mains" electricity was introduced to the Gatehouse area in the 1930's but may have been produced on site by a private generator plant, water or steam powered, prior to that date.

There is evidence in the upper mill building which points to the possibility of steam power having been used for machinery post 1920.

At the left end of the building a concrete plinth with large cast-in bolts, together with concrete bearing blocks and a ramped wheel pit in the floor, indicates the probable site of a small horizontal engine, steam, town gas or oil powered together with large

flywheel/pulley for belt drive to overhead, or external, power transmission shaft. A series of photographs exist which shows both the site and the interior of the upper mill building in their post 1920 form. From these photographs it is apparent that general sawmilling activities were carried out and that the bobbin lathes, morticers etc. were powered by ropes, belts and overhead power shaft similar in form to those used in earlier years for cotton spinning and weaving machines.

Following various changes in fortune and ownership, the bobbin mill finally ceased production c1938 and such machinery, steelwork etc. as existed at this time was removed for scrap during the second world war.



## **Dereliction and Restoration 1938 - 1987**

Following the closure and partial demolition of the Mills circa 1938, nature took over. Dense undergrowth and trees covered the site, the lower 3 storey mill building (now restored) virtually disappeared under a heavy curtain of ivy. Water continued to flow down the west lade, over the single storey remains of the Upper Mill, falling into the external wheel pit and flowing past the lower Mill, into the River Fleet.

At Loch Whinyeon, a concrete dam and sluice, constructed at the entrance to the tunnel, deprives the lades, formerly linking the loch to High Creoch Burn, of their source of supply. A sluice system has been installed on the east side of the loch to supply domestic water to the eastern Stewartry area via Glengap Filter Station located above Twynholm Village. The tunnel, spoil heaps and dry hillside lade routes are still discernible.

On the Barlay Burn, above Loch Lee Bridge, water is still diverted into the lade system to flow, via Barlay Mill

wheelpit, where the timber axle-tree remains in-situ, to the west mill pond at the head of the village.

On the Disdow or Bush Burn, at Bush Bridge in Cally Woods, a small volume of water is still diverted to flow, via the Mill Pond above Cushat Wood, partially underground past the former Scotts Mill to intercept the main lade at the head of the village.

The West Mill Pond, behind the war memorial, has gradually silted up to become a marsh, with bullrushes and willow trees. The east mill pond has been drained to become the site of a garage.

Water still flows through the west pond, under the “new” road, channelled round the garage buildings to again cross under the Main Street, to flow down the west lade to the mill site and the River Fleet.

The east lade still runs down through Games Wood to the river, probably now mainly surface water as the former connection from the east mill pond has been blocked off at the rear of the present garage

In 1987 clearance and restoration works commenced on the former Birtwhistle Mills site to form “The Mill on the Fleet”.

### **The Present Day**

A feature of the restored Mill complex is operational water wheels. The present flow of water into the site is obviously much reduced when compared to that of former times, evidenced by an extract from the contract of 18th March 1785 between James Murray and the Birtwhistle Brothers, which states ..

*“.... the full benefit, privilege and use of the water in the Loch commonly called Loch Whinny (Whinyeon), the burns, springs and strands collected and brought into swift cuts and course”. “... for bringing away four feet of water from the said loch, below the ordinary state and level of the water thereof and carrying and conveying the same from the said loch until it strikes the burn of Barlae and the Milndam there, so as the proprietors of the Mills might at all times have the command and benefit of the water ...*

When cotton spinning and weaving was at peak

production several persons would have been employed in maintaining the complex system of lades and ponds, constantly adjusting the various sluices to ensure optimum flow of water to the mill wheels, present water flow is largely dictated by rainfall and the resultant level of the Barlay Burn!

The waterwheels now installed on site are authentic, original locally manufactured units, they illustrate the comparatively minor advances in the design and construction of waterwheels over the hundred year period 1824 to 1924 and also highlight the relative efficiency (or inefficiency) of “overshot” and “undershot” wheels. The large, overshot, upper wheel is efficient to the extent where it suffers from an embarrassing excess of water flow at times, where as the lower, undershot wheel is relatively inefficient and prone to stoppage due to low water flow and “backwater” due to high tides.

Details of the waterwheels, their construction and origin is as follows:

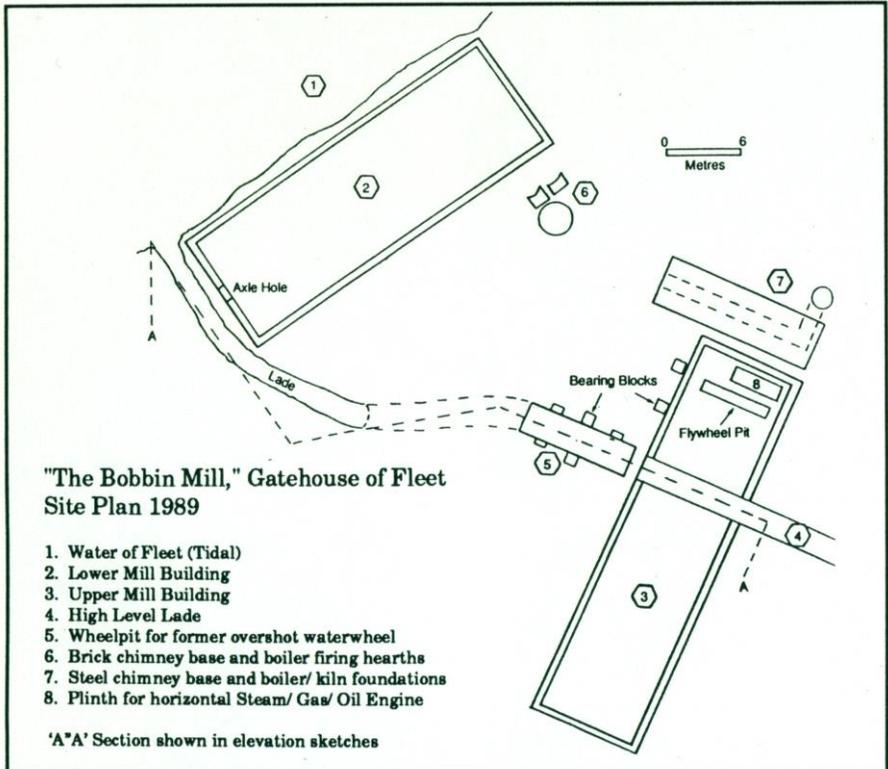
### **Wheel on lower (restored) Mill Building**

12ft dia. 3ft broad low breastshot wheel with cast

iron axle, hubs and rims, (6 section). Timber arms (9), and paddle boxes (36).

Internal gearing comprising main pit spur gear wheel cast iron 6ft dia. 5 inch broad with 76 teeth and 8 cruciform arms on hub keyed to water wheel axle, this driving cast iron spur gearwheel 16 inch dia. 5 inch broad with 20 teeth and 4 straight arms on hub keyed to short drive shaft with cast iron and steel flat belt pulley 4ft dia., 7 inch broad, steel rim riveted to 10 oval section cast iron arms and hub.

This wheel is constructed from original components obtained from Drumburn Sawmill near New Abbey and Boghall Farm, Dalswinton. The axle, hubs and all gearing came from Drumburn Mill and were originally installed there by W. Hay, Millwright in 1824, using components manufactured by John Affleck, Palmerston(e) Foundry, Glasgow Street, Maxwelltown. As found, the Drumburn wheel was 14ft dia., 4ft broad but the cast iron rims were damaged beyond repair and in any case



were over-large for use at Gatehouse. The 12ft dia. rims from the Boghall Farm wheel were therefore utilised in the re-construction of the present wheel.

The use of 9 spokes (arms) is considered uncommon but the wheel at the New Abbey Corn Mill, near Drumburn Mill, also has 9 spokes, perhaps a local peculiarity?

The form of construction used for the cast iron axle and hubs is interesting, being similar to the original timber “axletree” form where the timber axle ends were bound by “shrunk on” iron rims and the end bearing journals “driven-in” to the end grain of the axle tree, hub to axle clearance being oversize to allow for “trueing-up” by wedges on site. In this case the foregoing method has been replicated in cast iron. (A timber axletree can be seen at Barlay Corn Mill).

All timberwork on the wheel has been renewed, using 6 inch x 3 inch oak for the spokes (arms) and 1 inch thick elm for the curved blades (paddle boxes),

The wheel is located on the east gable of the restored mill building utilising the original

axle hole and is considered “correct” as to diameter, representing the form of earlier wheels used in this position. The internal spur gear wheel and transmission gearing is located in the original gear wheel pit, excavated during building restoration. It is probable that several different wheels were used in this position over the years but all must have suffered badly from “back water” at times of high tide. A 22ft dia. 8ft broad undershot water wheel, presumably used at this location, is listed in an auction sale catalogue dated 1858, this wheel obviously did not utilise the original axle hole and gear wheel pit. On removal of the ivy covering the building prior to restoration evidence was found of a bearing plate at a higher level to the right of the original axle hole, probably the centre point of the large wheel.

### **Wheel in Wheelpit by Upper (Ruined) Mill Building**

20ft dia. 3ft 9 inch broad overshot wheel with cast iron hubs and rims (10 section), 8 inch solid steel axle, 4 inch x 2 inch steel channel section arms (10) and timber paddle boxes (50).

This wheel constructed from original components obtained from Milldriggan Mill, Braehead, Kirkcinner, originally manufactured and installed there by J and R Wallace, Castle Douglas Foundry in 1924 (see “by-gone Dumfries and Galloway” volume III by Desmond Donaldson for illustration), wheel as installed at Milldriggan was “backshot” with sheet metal buckets and drove 4 pair of mill stones. The wheel was located in a wheel pit inside Milldriggan Mill, removal of same, in sections, was somewhat difficult, all components being removed via a standard 6ft 6 inch x 2ft 9 inch doorway! Also found at Milidriggan, at the base of the wheel pit, under the water wheel, was a turbine unit, installed in the 1930s to drive workshop machinery, milking machine, water pump, etc .

The wheel is located in the restored wheelpit fronting ruined Upper Mill building, supplied by re-constructed timber overhead lade. The Main axle has been extended to suit wheelpit width. Steel channel section arms have been renewed and paddle boxes reconstructed in timber, using one and a quarter inch thick elm,

As installed, off-centre of the wheel pit, this wheel is considered to represent the form of wheel in use immediately prior to closure of the Bobbin Mill in the 1930s.

It is probable that several wheels of varying construction and dimensions were used in this position over the years. It is possible that the first water wheel was located within the upper mill building, the external wheel pit being adopted in the 1800s when greater power would be required for the power looms installed at that time. Certain publications list the wheel as having been 25ft dia. 8ft broad. Wheel pit and water fall dimensions would confirm this to be possible but an advert in “Dumfries Weekly Journal” 6 March 1810 advising “Birtwhistle Mills to be let or sold” indicates that 4 storey (upper) mill had 30ft x 6ft water wheel, again site dimensions confirm this to be possible.

On excavation of the wheel pit prior to restoration heavy timbers with bearing components attached were found within the pit which would indicate the probability of a narrower wheel, mounted off-centre, having been used prior to the closure of the mills.

## **Restoration of Replacement Wheels**

All metal work was shot blasted to remove rust and scale, cracks in castings repaired and several missing sections reconstructed. Adaptor sections were manufactured to make the lower wheel timber arms (spokes) to the replacement rim sections. New channel sections were manufactured for the upper wheel arms. All timber spokes and buckets were reconstructed in traditional form, using oak or elm as appropriate.

Personnel involved in the wheels restoration as follows:-

**H Hollis, Engineer, Annan**  
Removal, restoration and installation of all metalwork, wheel components.

**MSC Team** .Site excavation, manufacture and installation of wheels timberwork, lade sluces, etc.

**Robison & Davidson Ltd, Builders, Castle Douglas**  
Reconstruction and restoration of all stonework for lade and wheelpits etc. Reconstruction of overhead lade supports.

**Department of Property Services, Dumfries and**

**Galloway Regional Council**  
Research, design and supervision of works.

## **Background Research**

General reference is made to early industry and life in Gatehouse in several publications of an “Antiquarian” and “Industrial Archaeology” nature, amongst those the following were consulted in the preparation of this booklet:-

## **Rambles in Galloway**

M McL Harper

**The Industrial Archaeology of Galloway**  
I Donnachie

**Old Galloway**  
I Donnachie and I McLeod

**Water Power in Scotland 1550 - 1870**  
J Shaw

**Exploring Scotlands Heritage .Dumfries and Galloway**  
G Stell H.M.S.O.

**The Gatehouse Experiment**  
P Mann

Information regarding routes of lades and water courses obtained from “Articles and Conditions of roup and sale of

Birtwhistles Mills and other properties in Gatehouse” dated July 1904, confirmed by examination of ordnance survey maps of Gatehouse and environs, 1848/50 series, and site inspection “in the field”.

Local Newspaper records held in Ewart Library, Dumfries proved to be a valuable source of information, a selection of relevant articles being as follows:

**1. “Dumfries Weekly Journal” 24 November 1795**

sale of John Pape’s Mill, etc. There are further references to John Pape in the Dumfries Weekly Journal over the period 1801 . 1803. In this period Pape was in Dumfries conducting a medical practice, advertising patent medicines, bleeding, teeth pulling etc! In 1803 he advertised the position of apprentice, stating preference for a”country lad!

**2. “Dumfries Weekly Journal” 6 March 1810** - let

or sale of Birtwhistles Mills and houses, details water wheel, machinery for the preparation and spinning of cotton in use prior to the initial closure of the mills,

**3. “Dumfries Times” 25 October 1837** Barlay Corn

Mill destroyed by fire, owner James Faed, Millwright and Engineer, father of John, James and Thomas Faed, prominent Scottish Victorian artists.

**4. “Dumfries Times” 20**

**October 1840** .Birtwhistle Mill Fire, correspondent described the incident in lurid detail as this extract shows;

*“We instantly hastened to the spot; and we cannot describe our painful and excited feeling’s when we beheld, issuing from the lower storey, fearfully dense volumes of wreathing smoke, and, from the windows of the flat above, females, some of them very young, imploringly stretching out their hands, and shrieking for assistance.”*

**5. “Wigtownshire Free Press” 2 January 1845**

reports a proposal for electricity in Gatehouse as follows:

***Go ahead, Gas won’t do.***

*“Gatehouse has come to a resolution worthy of herself. The luminary will be placed on the top of Rutherford’s monument, and is expected to be brilliant enough to enable*

*the operatives in the cotton mills to pursue their nocturnal*

*avocations, without having recourse to any other light, Beyond the primary cost of fitting up the pillar, little or no expense will be incurred, it having been ascertained that sufficient electricity for the purpose can be generated by the action of Loch Whinnion water upon brick-bats.-Corres. “*

The first impression of this article is that it should probably have been held over until 1 April, however, when one considers the following facts, regarding electricity -

circa 1830 Faraday discovered the basic means of producing and using electricity

circa 1860 Arc lamps for city streetlighting introduced,

circa 1878 first practical hydro-electric scheme introduced by Armstrong at his home, Cragside House, Northumberland.

circa 1879 Swan and Edison perfected incandescent lamps

and regarding coal gas -  
circa 1805 Murdoch introduced gas lighting in Manchester Mill.

circa 1807 Pall Mall in London became the first thoroughfare in the world to be lit by gas.

circa 1840 Many London streets lit by gas.

circa 1850 Use of gas lighting spread to other cities and major towns.

Then the proposers of the Gatehouse lighting scheme showed remarkable foresight in considering hydro-electric lighting as an alternative to the, then comparatively new, gas lighting! In the event gas lighting was subsequently adopted for Gatehouse street lighting and it was to be some 74 years before electric street lighting was again considered. In 1919 the Town Council,

concerned by the rising cost of gas lighting and resultant disputes with the gas supply company, contacted a Glasgow electrical engineer to investigate the possible use of the Bobbin Mill water wheel to generate electricity for street lighting. The engineer, H A McGuffie Esq, MEEE.

of Hope Street, Glasgow, reported however, that the lades and water courses supplying the mill wheel were badly silted up to the extent that insufficient power could be generated to make the

scheme worthwhile. It was to be the 1930s before the inhabitants of Gatehouse were to finally enjoy the benefits of electric street lighting.

## **6. The Wigtownshire Free Press November 21 1867**

reports, under the heading:-  
*“Destruction of Barlay Bobbin Mill”:- At five o’clock on Monday morning one of the workers at Barlay Bobbin Mill observed smoke issuing from the roof of the building, and immediately gave the alarm. The people in the neighbourhood gave every assistance, but within a few hours the mill, all the machinery, and an extensive stock of bobbins and wood were totally destroyed. The loss would have been considerably larger had the fire reached the drying sheds and clumps of wood adjoining: but soon after the commencement of the fire a messenger was despatched for the Cally fire engine, which was speedily on the spot, and under the charge of willing workers it did effective service in preventing the spread of the flames. The origin of the fire has not been ascertained. There has been no fire in or near the mill for eight days, and on Saturday evening everything was secure. It is summarised that some person may have got into the mill on Sunday night, and pulled down the sluice, thereby allowing the water to run over the wheel; all the wheels and*

*machinery would thus be driven without any check, and in consequence some of the shavings may have become ignited. The building and machinery are insured in Sun Fire Office. Unfortunately from 20 to 30 workmen will be thrown out of employment for a considerable time.”*

## **8. "Dumfries and Galloway Standard" November 12 1919**

reports:-

*“The Gatehouse bobbin mill was totally destroyed by a fire which started early on the previous Saturday morning, only the walls being left standing. The proprietors at that time being Messrs. Bailey and Clegg, who traded as Walker & Co. Some 30 persons being employed. The mill at that time was lit by electricity. Damage was estimated at 3,000. This was the third fire at the mill, the last fire being 44 years ago.”*

The foregoing are representative of the numerous references to industry and life in Gatehouse which must exist in local newspaper records. Further research by others would doubtless be worthwhile and would provide an interesting picture of Gatehouse of Fleet in the 18th and 19th centuries.



