

# The Water Mills of Baldernock Parish

Paul Bishop provides an in-depth examination of 19th-century water mills, focusing on current research into the rural parish of Baldernock on the outskirts of Glasgow

The Domesday Survey of 1086 documented 5624 water mills in England, and water-driven mills remained a common feature of the landscape right through to the 19th century and later. One heavily-used English river in the early 17th century, for example, had 24 mills on just fifteen kilometres (about ten miles) of river, and in the Sheffield area at the end of the 18th century, there were three watermills per kilometre of stream. Late 17th century France had more than 95,000 watermills, and, more astonishingly, there were more than 65,000 water-powered mills in just twenty states of the eastern US by 1840. Scotland also had many mills, concentrated in the Northern Isles, eastern Scotland, the Southern Uplands, the Lowlands, and scattered about the edges of the Highlands.

Mills were so abundant for several reasons, including the relative simplicity of the technology, the ubiquity of flowing water and sites suitable for water mills in the Scottish landscape, the prominence of oats in the Scottish diet, the practice of thirlage whereby estate tenant farmers were bound to have their grain milled at the estate mill, and the protection of local mills by the duty imposed on imported grain (under the so-called Corn Laws). That duty was lifted in the mid-19th century, partly in response to the Irish potato famine, and local mills quickly began to feel competition from the large, town-based mills, like the many mills



Map 1. The distribution of Scottish place names containing the words 'mill', 'miln' or 'milton' but excluding the Gaelic *muileann* (gen. *mhuilinn*) (data from the Ordnance Survey Gazetteer of the OS 1:100,000 map series; figure by courtesy of Esperanza Muñoz-Salinas)

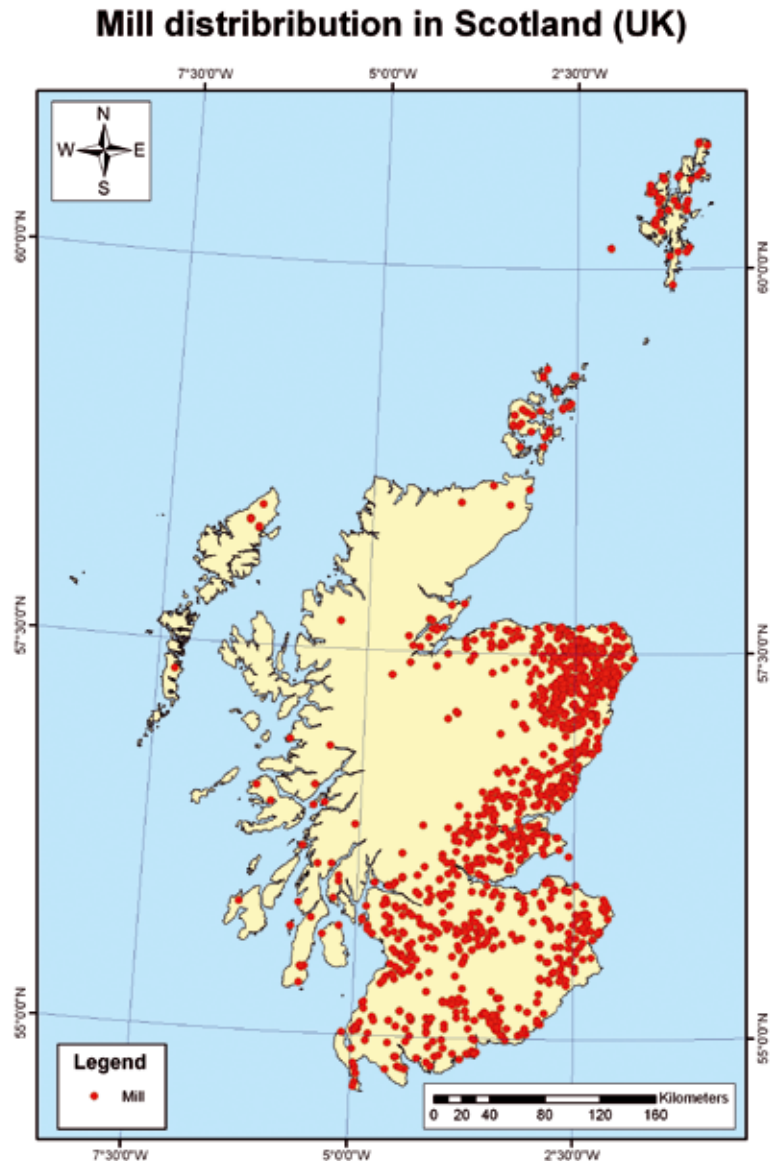


Figure 1. Several mills in Partick on the Kelvin River, looking upstream, in 1825. The large one left of centre, with the three arches, is the Regent Mills

on the Kelvin River in Glasgow, that started milling cheaper bulk grain from North America. This change, along with the gradual abandonment of thirlage at different times across Scotland, meant that many small rural grain mills became uneconomical and either closed down or were converted to other activities, such as saw-milling.

This article describes the mills of the parish of Baldernock, to the east of Milngavie on the northern

outskirts of Glasgow. Baldernock is one of the smallest rural parishes in Scotland, with its current well-known church dating from 1795. The parish retains its rural character, despite being only about twenty minutes from the centre of Glasgow, and the locality is of particular interest here because it has one functioning water mill (probably the closest functioning mill to the largest city in Scotland) and records of two others. I discuss



Map 2. Portion of the 'Levinia, Province of Lennox' sheet of the 1654 Blaeu Atlas showing the Baldernock area. The star-like mill wheel symbol labelled 'Mill' at centre left is the Baldernock Mill with the 'Bodeirnock K[irk]' to the north-east. The 'Achinhowi' mill symbol is south of the Baldernock mill. Many of the localities on this map extract are still identifiable



Map 3. The Baldernock area on the 1747 General Roy map, showing 'Fluchter Mills' in its correct location relative to Bardowie Loch, and 'Mills of Badernock'. There is no evidence of more than one mill at either Fluchter or Baldernock, so that plural form may reflect mid-18th century usage. Note the absence of any indication of a mill at the Jaw, to the northwest of Bardowie Loch, or at nearby Achinhowie. Dougalston Estate is west and northwest of the Jaw and includes a formal Scots garden



Map 4. Baldernock on the 1795 Richardson map, showing the Baldernock Mill (centre right) and the Fluchter Mill (far right). The mapping in the vicinity of Baldernock Mill is inaccurate: the Mill actually lies to the north of the road between Down and Kettlehill. Note 'Mil[n]gavie' to the west, itself a mill ('miln') town, and the Dougalston Estate (centre), which has been transformed by landscaping and the addition of a second formal garden

those two first and then turn to Baldernock Mill itself.

### Auchenhowie Mill

The most shadowy of the mills in Baldernock is the Auchenhowie mill. It is traditionally identified with the house called 'The Jaw' at the western end of Bardowie Loch in the south of the parish, and local tradition interprets 'Jaw' as a corruption of jet d'eau ('splash' or 'chute of water', with the obvious implication that 'Jaw' derives from the fall of water at a mill). However, and as I show below in more detail, the settings of the other two mills in Baldernock, both of which are mapped on the

earliest OS maps and named on earlier maps, are quite different to that of the Jaw. Those two mills are located on steep sections of small burns and this steepness gives the fall of water necessary to deliver water to the top of the mill wheel for its most efficient operation (overshot or backshot wheel) or at least to part-way up the wheel (breastshot wheel). In both those cases, the weight of water in the buckets on the mill wheel provides

the power to turn the wheel, and this arrangement requires a steep stream so that water can be brought to the top of, or part-way up, the mill wheel.

Nonetheless, the 1645 Blaeu Atlas (based on the Timothy Pont maps, amended and edited by Gordon) shows the mill symbol at 'Achinhowie' at the locality of the Jaw, at the western end of Bardowie Loch. The outflow from the western end of the Bardowie Loch flows through low-lying swampy ground, however, and it is difficult to see how this setting could have accommodated a water mill with a wheel driven by water delivered to the top of the wheel. Perhaps the Auchenhowie Mill was powered by an undershot wheel, in which the water flows past the bottom of the wheel, with the flow turning the wheel by pushing against the boards



Figure 2. Baldernock Mill from the south. The white rough-cast building on the right is a mid-19th century dwelling built over the remains of the mill's drying kiln. The stone building in the centre is the corn mill building, and the dark timber building lower left is the lean-to saw mill, which is still operational. The mill wheel is pitchback with the lade delivering water from the right (from the upstream dam) and the water flowing back to the right from the gently sloping wooden box channel (the launder), down the right-sloping steep chute to drive the wheel. The long steep left-sloping structure to the left of the wheel returns unused water from the lade to the burn, lower left. The masonry wall at the mill wheel (the so-called water wall) bears circular scratch marks from an earlier, smaller diameter wheel

or vanes of the wheel. The undershot wheel is less efficient than overshot, pitchback or breastshot wheels, but is an early form of the mill wheel that was often used because of its simplicity of design and operation (and precisely because it did not require the infrastructure to bring water to some way up the mill wheel). So, the Auchenhowie Mill is plausible in its supposed location but that location is not particularly suitable for a mill and it will have to remain shadowy until further work throws more light on it.

### Fluchter Mill

Fluchter Mill is located to the northeast of Bardowie Loch, and is mapped on the Pont/Blaeu map with a labelled mill symbol, in a position somewhat more east of the Loch than its actual location. It appears on the General Roy 1747 map and virtually all subsequent maps.

The Fluchter Mill was the mill for the Bardowie Estate but there are no remains of a mill at the locality; the main evidence of its former existence comes from maps (including the first edition and subsequent OS maps). One of the most intriguing maps is the 1845 'Map of the Lands of Barnellan', apparently showing the mill lade (water race) from the adjacent burn to the Fluchter Mill building. The mill is set beside a steep fall (a step) in the unnamed burn, with the lade

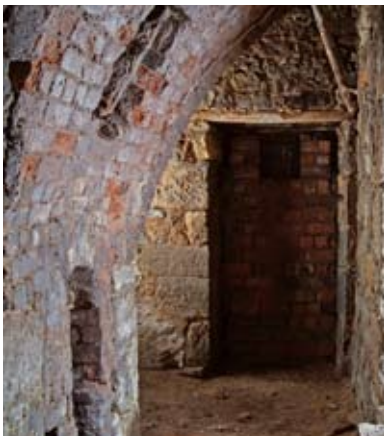


Figure 5. The kiln at Baldernock Mill is attached to the eastern end of the mill, in the foundations of the cottage. The arched fire-hole is at lower left with the upward flare of the kiln oven above. The lower level of the mill itself is immediately to the right, reached by a connecting doorway (photo by Les Hill)



Figure 3. The drive shaft from the mill wheel with large geared pit wheel that drives the fly wheel in the saw mill via the bevel gear and shaft to the right (photo by Les Hill)



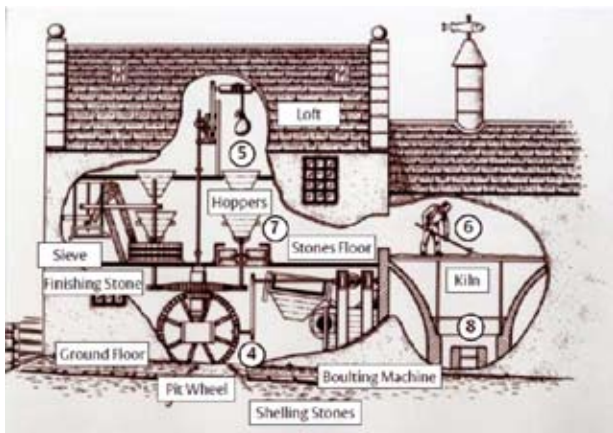
Figure 4. The saw bench in the saw mill. The large red fly wheel, driven by the shaft with the bevel gear, drives the belt to power the saw blade (left) (photo by Les Hill)

bringing water to the mill from the top of the step in the river. If the mill were set a little below the top of the step, water could be brought to the top of, or at least part-way up, the mill wheel.

### Baldernock Mill

Baldernock Mill is the most intact of the mills of the parish. There

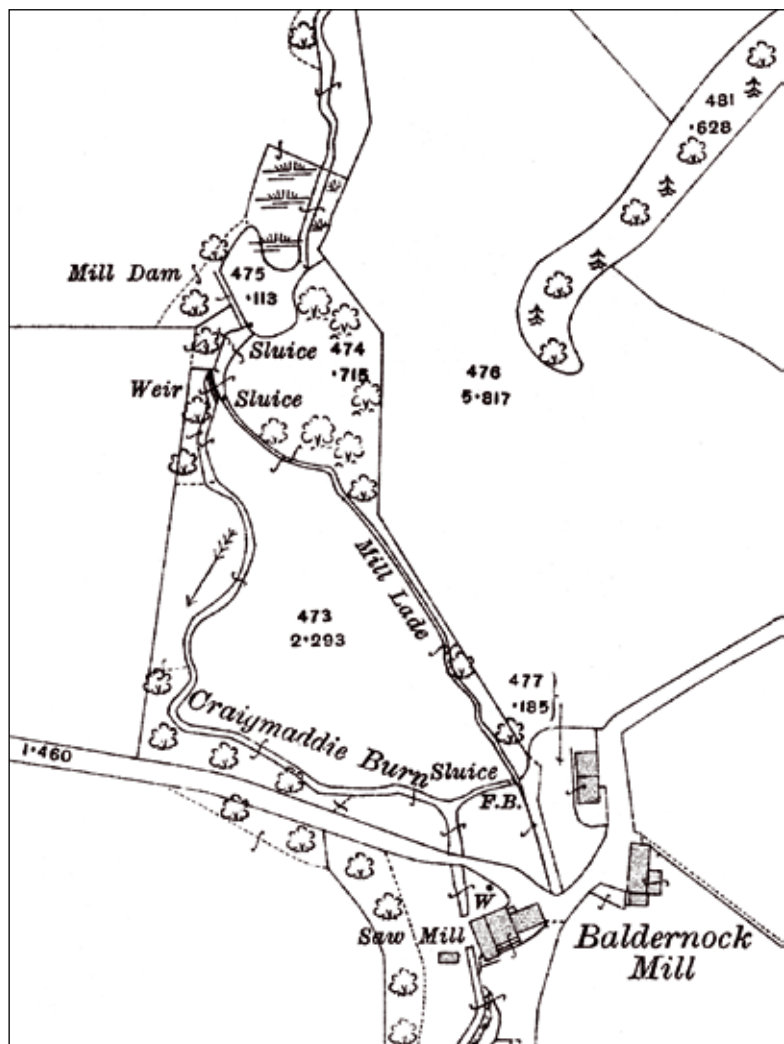
has been a watermill on this site since at least 1532, when James V is recorded as having granted to a local noble family 'the mill and advocation of the Church of Bothornock [Baldernock]'. Baldernock Mill was originally a corn mill but the first edition OS map shows that a saw mill had been added to the corn mill by the 1860s,



presumably in the present lean-to building at the side of the corn mill; the lean-to still houses a saw mill. Such lean-to saw mills were not uncommon, generating further income for the miller, especially once agricultural improvement began and demand for sawn timbers for fencing and so on rose. Water-driven saw mills became even more important once the Corn Laws were repealed and income from grain milling collapsed. Baldernock Mill still functions as a saw mill in the lean-to building attached to the side of the original two-storey stone mill building, but the corn mill machinery has long been removed. These modifications to the mill may have been made in the mid-19th century when the present dwelling was constructed on the eastern side of the mill building. This cottage is built over the remains of the kiln which was used to dry the grain before milling. The kiln and the traditional thatched roof were common causes of fire at a mill and even though the demise of grain milling meant that kilns were no longer necessary, the abundance of timber at saw mills meant that they also often caught fire. The Kirkintilloch Herald reports an incident at Baldernock Mill in 1932 in which a container of hot bitumen overturned outside the mill and ran down into the saw mill, setting the timber and mill on fire.

A key requirement for milling is, of course, mill stones. Two circular stones are used, the lower one (the nether stone or the bedstone) generally stationary and the upper one (the runner stone) rotated by the machinery and gearing from

Figure 6. Diagram of the New Abbey Mill showing the mill layout, and the location and structure of the kiln. The layout of the Baldernock Mill as viewed in figure 2 is the same as that shown here (ie, with the kiln on the right). (Courtesy of Historic Scotland)



Map 5. The Baldernock area on the 1918 OS map (original scale 1:2,500) showing detail of the layout of mill dam, weir, sluices, lade and mill



Figure 7. Circular millstone that has not been detached and lifted from sandstone outcrop on the moors above Baldernock

the mill wheel. Grain is fed slowly through a hole in the centre of the spinning upper stone and is ground to flour as the grain makes its way outwards between the two stones. Obtaining the right type of rock for the millstones is important, and it is a great advantage to have stone available locally, thereby avoiding transportation costs. Millstones are commonly pebbly sandstones, conglomerates and gritstones. A mill stone at Baldernock Mill, with a diameter of 1360mm, is of uncertain origin and it is unknown if it is a stone from the mill. The local sedimentary rock types in Baldernock are sandstone, limestone, conglomerate and coal, and there are good, accessible outcrops on the moorlands above Baldernock. Several parts of these moorland outcrops have been worked for millstones, and exhibit all stages of that process, from the marking out of the circular millstone on the rock's surface to worked stones that have not been lifted (ie, stones that are still attached to the rock) to circular cavities marking the positions of lifted millstones. It is presumed that these workings relate to either Baldernock Mill or Fluchter Mill, but they may have

**Figure 8.** The breach in the dam wall at its left-hand end (looking downstream). The squared blocks that make up the wall can be seen on the right-hand side of the breach. The sloping grassed surface on the right is the top of sediment trapped in the dam



**Figure 9.** The light-coloured clay seal on the upstream side of the wall (arrowed, behind the roots at centre); the brownish material to the right is sediment trapped in the dam. Flow is right to left

been being extracted for mills in adjacent areas or to be used as 'on end' stones for grinding whin (gorse bush) for cattle feed, as reported by a local farmer.

In the 19th century, Baldernock Mill was part of Dougalston Estate, which was purchased in 1767 by John Glassford (1715-1783). Glassford was one of the wealthiest of the famous Glasgow Tobacco Lords who made their fortunes in the tobacco trade with the American east coast colonies

after the union between Scotland and England. Several of the Tobacco Lords purchased country estates, including Alexander Speirs. North Bardowie, immediately to the north of Fluchter Mill, is also said to have been owned by a Tobacco Lord. Part of the motivation of the Tobacco Lords in purchasing country estates may have been an attempt to mimic the aristocracy, who apparently had little time for the nouveaux riches Tobacco Lords. So, Dougalston was Glassford's country estate and perhaps his statement that he had 'arrived' socially. Maps from 1747 (Roy) and 1795 (Richardson) suggest that Glassford landscaped Dougalston in the contemporary fashion, probably following the trend led in England by the famous Lancelot 'Capability' Brown, but that conclusion awaits further work. Those matters notwithstanding, one of Glassford's principal activities at Dougalston seems to have been carousing and gambling with his colleagues, most of which took place in the dining house. This small Georgian building has long been locally known as the Factor's House, reflecting its being the estate factor's house in more recent times, and it has recently been renovated, extended and named Glassford House.

When Glassford died in 1783, Dougalston passed to his son Henry (see 1795 map), and then



subsequently through various members of the Glassford family until sold to Robert Ker in 1870. Ker demolished Dougalston House and built a new mansion, which was damaged by fire in the 1920s and ultimately demolished when the modern Fairways housing estate was constructed. The second-last Glassford owner was thus evidently responsible for the addition of the saw mill.

**The mill dam**

The water to drive the mill comes from the Craigmaddie Burn, diverted half-way down a steep fall in the bed of the burn, about 200m upstream of the mill, and brought round the contour via a lade (race or channel) to the wooden box-channel at the top of the mill wheel. The point of abstraction of water on Craigmaddie Burn is marked by a low weir which elevated the water level and diverted part of the flow into the lade past a sluice. This weir has now largely been demolished.

The mill dam was presumably built to ensure water to drive the wheel during dry periods. The dam wall impounded water from the catchment area of Craigmaddie Burn and is now breached. The wall, c.1.2 m thick, consists of outer (downstream) and inner (upstream) 'skins' of dressed and well-fitted (but not mortared or pointed) sandstone blocks, with a rubble fill between these two 'skins'. The dam wall sits on the upstream lip of the fall in Craigmaddie Burn and the steep downstream face of the wall has large sandstone boulders ramped against it, presumably to give stability and support to the wall in its somewhat precarious and unstable position at the top of the steep fall. A thick lens of pale yellow clay was built up against the upstream face of the dam wall at construction, presumably to seal it.

Sediment up to ~1.5 m thick has been trapped in the dam over time, progressively decreasing the capacity of the dam. We have analysed various physical and

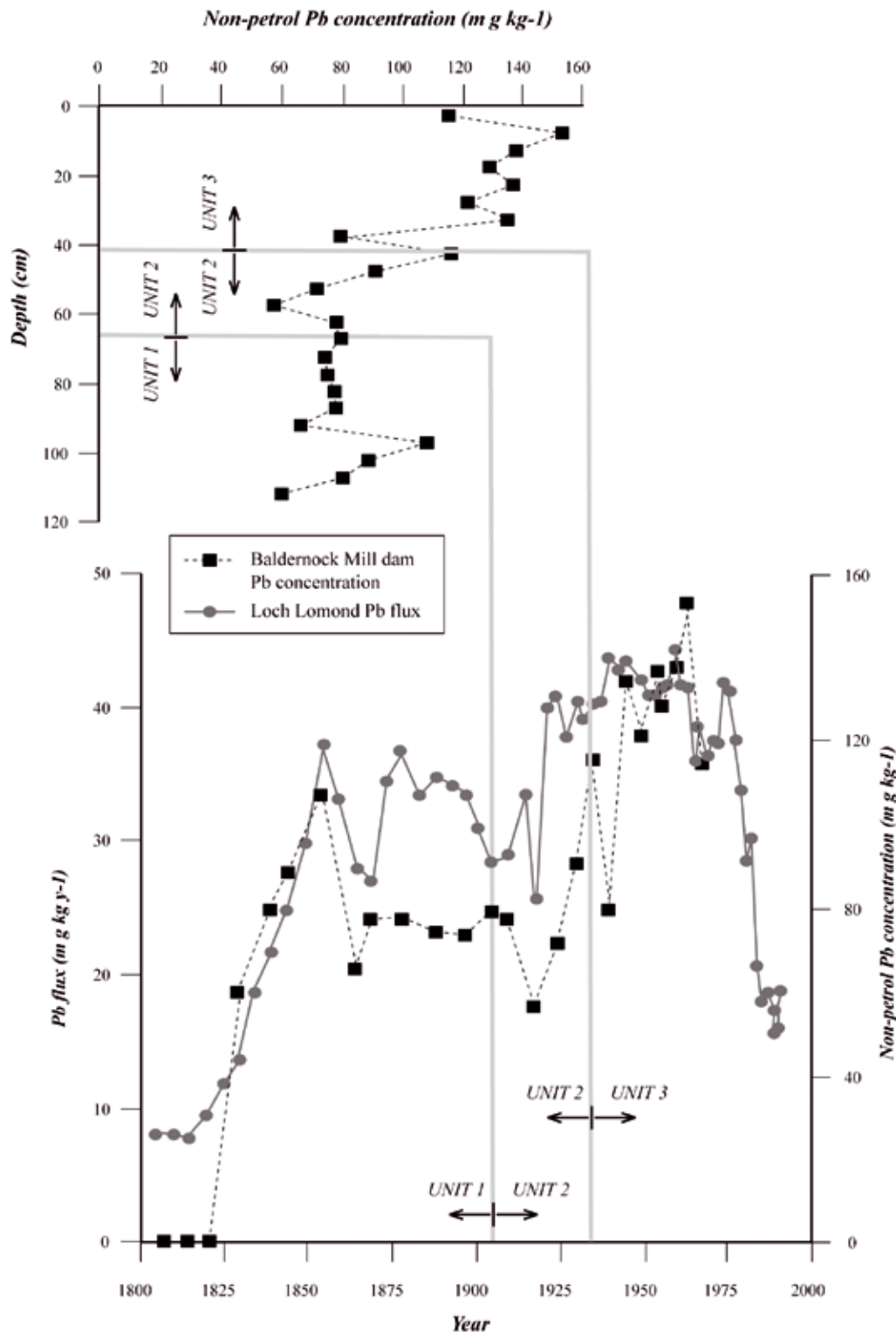


Figure 10. Graphs comparing the content of non-petrol lead in the Baldernock Mill dam sediment core and the record of excess lead in the Loch Lomond core, which was dated using the lead-210 technique. The dates of the various sedimentary boundaries in the Baldernock Mill dam sediments can then be determined as shown (courtesy of Esperanza Muñoz-Salinas)

chemical properties in a 1.2m core extracted from the sediments to determine the age of the dam's construction and its failure. Unit 1 in the sediments, the lower 50cm of the sediment at the base of the sediment infill (i.e., overlying the pre-dam soil), consists of repeated

'triplets' of a thin flood sand layer, overlain by a mud (the sediment that settled out of the dam water after the flood), overlain in turn by a layer of leaves and twigs, which we interpret as the autumn leaf fall. Every year has an autumn leaf fall but not every

year necessarily has a flood (sandy layer), and so several autumns may be represented by one leaf layer. There are 43 of these sand-mud-leaves triplets and so the bottom 50cm of the sediment are interpreted to represent at least 43 years of deposition. The middle 25cm of the core sediment (Unit 2) lack a consistent organic layer, which is interpreted as reflecting the lack of a lake for the autumn leaf fall to accumulate in. These 25cm are taken to be the result of deposition of flood sediments behind a dam wall that was being progressively breached. The top 45cm (Unit 3) are flood deposits trapped behind that breached dam wall – large floods carrying sediments cannot pass through the dam immediately, even though it is breached, and so flood sediments would still have been deposited.

The lead content of the sediments was analysed to provide ages for these various changes in the mill dam. We wished to estimate, firstly, the age of construction of the dam, based on the age of the oldest sediment deposited in the mill dam, and, secondly, when the breach in the dam wall began to develop (corresponding to the age of the boundary between Units 1 and 2). The oldest sediment in the mill dam dates to ~1825, which is consistent with the 19th century character of the dam wall construction. The breach occurred in about 1905, a date which is consistent with the OS maps data: no breach is shown in 1899 and a breach is indicated in 1918. The 1918 map can be interpreted as showing only a partial breach, whereas the 1938 map shows a complete breach.

The current dam cannot be the first dam on this site, however, because the 1747 Roy map shows a body of standing water labelled 'Mills of Badernock' where the present dam is located, to the west of the 'Mance' and 'Kirk of Badernock'. Thus, the damming of Craigmaddie Burn to supply water for Baldernock Mill is a long-standing feature, like that of the mill itself.

## Conclusions

Working mills close to large urban centres in Scotland are rare and Baldernock Mill is one such rarity, representing just the latest phase in the history of such rural mills. Baldernock, the smallest rural parish in Scotland, had at least two mills, and probably three, with the certain of those, the Fluchter and Baldernock Mills, latterly being the mills for the Bardowie and Dougalston Estates, respectively. If the Auchenhowie Mill did exist and was located on the Bardowie Loch outflow, then it may have been an earlier estate mill for the Bardowie Estate. Like the Auchenhowie and Fluchter Mills, most rural mills in Scotland have fallen into disrepair and disappeared since the mid-19th century repeal of the Corn Laws, the growth of imports of grain, and the abolition of thirlage. Only those mills that had other uses, or could convert, survived. Saw milling was a viable mill conversion, as Baldernock illustrates, and a wide range of industrial milling activities could be powered by water, including talc grinding, as at the nearby Balgrochan (or Ferrie) Mill in Torrance, and cloth printing, as at the Lennoxmill in nearby Lennoxton.

The mills of Baldernock Parish illustrate very well the ways in which Scotland's water mills occupied particular settings in the landscape, settings that are different from those in, for example, England or the eastern United States. Scotland's water mills were/are generally sited

along steep reaches of small rural streams to exploit the particular character of Scotland's topography and landscape history, especially the glacial legacy of steep bedrock streams with many cascades and steps. A second important lesson of the Baldernock mills is that the evidence of these mills remains very clear in the landscape, once the nature of that evidence and its subtlety are realised. That clarity of evidence is well illustrated by the Baldernock Mill dam, which has not been renovated or repaired in the ways the mill itself and the sluices and the lade have been. Nonetheless, the dam wall and the remains of the weir at the off-take to the lade are still clear. My reconnaissance throughout these small rural parishes north of Glasgow has revealed much evidence of such former structures. Indeed, the ubiquity of mills in the rural landscape and the great number of these industrial sites – small, medium and large – are still very much in evidence, once the signs of their former presence can be read.

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## FURTHER READING

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