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“OS 25-inch mapping of threshing mills in  
Scotland”

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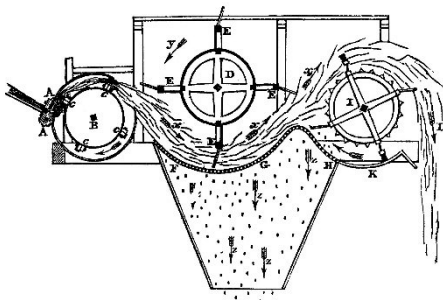
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## ***OS 25-inch mapping of threshing mills in Scotland***

***Paul Bishop***

OS mapping provides the potential to document past landscapes and land use and thereby to assess changes in landscape and land use over time. Richard Oliver's *Ordnance Survey Maps: a concise guide for historians* aims to guide such use of OS mapping. In my note in *Sheetlines* 120 on the mapping of watermills, I asked, among other things, whether the technology of a particular watermill – overshot, backshot, etc – could be inferred from OS mapping of the mill, a question that is still being addressed by new data I have received since that *Sheetlines* 120 piece was published. In this note, I examine how the OS mapped mills that threshed harvested grain to remove the husk from the grain. The key issue for the historian of land use in relation to OS mapping is that the presence of a threshing mill implies a grain crop that had to be threshed, even when other mills, powered by wind or water, are comparatively lacking. The distribution of threshing mills thus provides insight into the historical presence of arable farming, as has been assessed in relation to horse gins in Baldernock Parish in Scotland's western Central Belt.<sup>1</sup>

Such threshing has been done for millennia using various flails to beat the grain or by beating the grain on a structure such as a threshing board.<sup>2</sup> The mechanised grain thresher was invented by the Scots millwright Andrew Meikle and patented in 1788 (*figure 1*).<sup>3</sup> This thresher seems to have been adopted more quickly in Scotland and northern England than in southern England, where the use of the flail apparently persisted for much longer. This issue, which is beyond the scope of this paper, is explored in some depth by Stuart MacDonald.<sup>4</sup>



*Figure 1. Diagram of Andrew Meikle's thresher. The unthreshed crop is introduced at left where it is held by clamps at AA and beaten by the projections on the rapidly rotating drum B. Drums D and I then carry the stalks forward, to be ejected at L. The grain and chaff fall down into a machine below where the chaff is winnowed from the grain.<sup>5</sup>*

The commonest sources of power for such a thresher were water, via watermills, and animals, which were occasionally oxen but more usually horses in

<sup>1</sup> Paul Bishop, 'Horse gins in Baldernock, East Dunbartonshire', *Vernacular Building* 38 (2015), 7-26.

<sup>2</sup> Alexander Fenton, 'Threshing the grain', *Farming and the Land. Scottish Life and Society: A Compendium of Scottish Ethnology* Volume 2, John Donald, 2011, pp.717-732.

<sup>3</sup> John Shaw, *Water Power in Scotland 1550-1870*, John Donald, 1984, pp.102-105.

<sup>4</sup> Stuart MacDonald, 'The progress of the early threshing machine', *The Agricultural History Review* 23 (1975), 63-77.

<sup>5</sup> David Low, *Elements of Practical Agriculture*, Edinburgh, 1874, available online on Google Books at <https://tinyurl.com/xvd7w9xe>, Figure 44.

a horse gin (also called a horse engine, a horse walk, a horse course, a horse gang, and so on). Wind was a third 'natural' power source, used only infrequently in Scotland, and then in due course steam power was used.

### ***OS mapping of watermills for threshing***

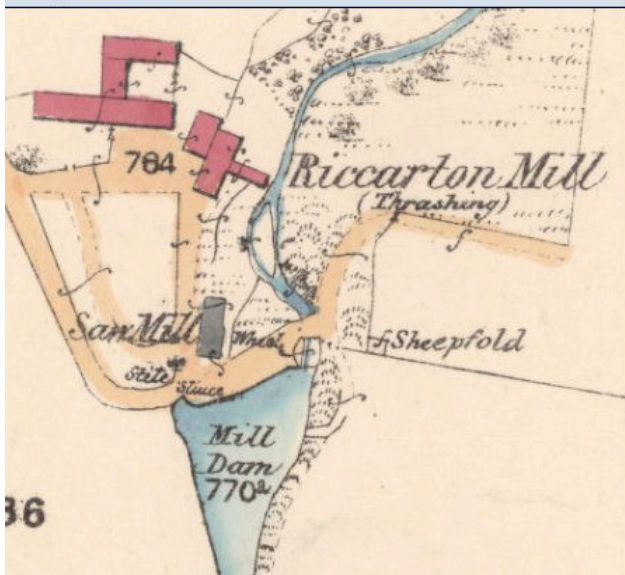
When the OS labelled watermills for threshing in Scotland (not all that commonly, as I note below), the Survey's practice seems to have been to use the term used in Scotland, namely, 'Thrashing' (*figures 2 and 3*). Also commonly used was 'T. Mill' (*figure 4*).

Linlithgowshire V.8 (Linlithgow)

Survey date: 1854 to 1855 Publication date: 1856

Size: map 64.4 cm x 96.6 cm (25.344 x 38.016 inches), on sheet ca.

Survey > 25 inch to the mile, 1st edition, 1855-1882



Perth and Clackmannanshire LXXV.5 (Cargill & Scone (Det.))

Survey date: 1861 Publication date: 1866

Size: map 64.4 cm x 96.6 cm (25.344 x 38.016 inches), on sheet ca.

Survey > 25 inch to the mile, 1st edition, 1855-1882



*Figure 2 (left) : Riccarton Thrashing Mill, which was clearly driven by water power. This mill was disused by the time of the 25-inch second edition. The sheet details for this and all map extracts used here are as given on the National Library of Scotland maps website and are provided above the map extract to save long captions. All map extracts are published with the permission of the National Library of Scotland.*

*Figure 3 (right) : Thrashing mill near West Kinnochtry. This mill is 'down-lade' from water-powered corn and saw mills*

*Figure 4 (opposite) : Three examples of the 'T.Mill' label on OS maps. 4a Garshake T(hrashing) Mill in the hills to the north of Dumbarton; 4b T(hrashing) Mill at Banton, near Kilsyth. By the time of the 25-inch second edition both of these mills had become corn mills; 4c T(hrashing) Mill at Braeval, near Aberfoyle. Local tradition has it that the Braeval mill was a lint (flax) mill originally and on the 25-inch second edition the mill is unlabelled and the dam has become essentially silted up.*

Dumbartonshire XXII.2 (Dumbarton)

Survey date: 1860 Publication date: 1862

Size: map 64.4 cm x 96.6 cm (25.344 x 38.016 inches), on sheet ca

Survey > [25 inch to the mile, 1st edition, 1855-1882](#)



Figure 4a

Stirlingshire XXIX.5 (Kilsyth)

Survey date: 1859 Publication date: 1862

Size: map 64.4 cm x 96.6 cm (25.344 x 38.016 inches),

Survey > [25 inch to the mile, 1st edition, 1855-1882](#)



Figure 4b

Perth and Clackmannanshire CXXX.1 (Aberfoil)

Survey date: 1862 Publication date: 1864

Size: map 64.4 cm x 96.6 cm (25.344 x 38.016 inches)

Survey > [25 inch to the mile, 1st edition, 1855-1882](#)

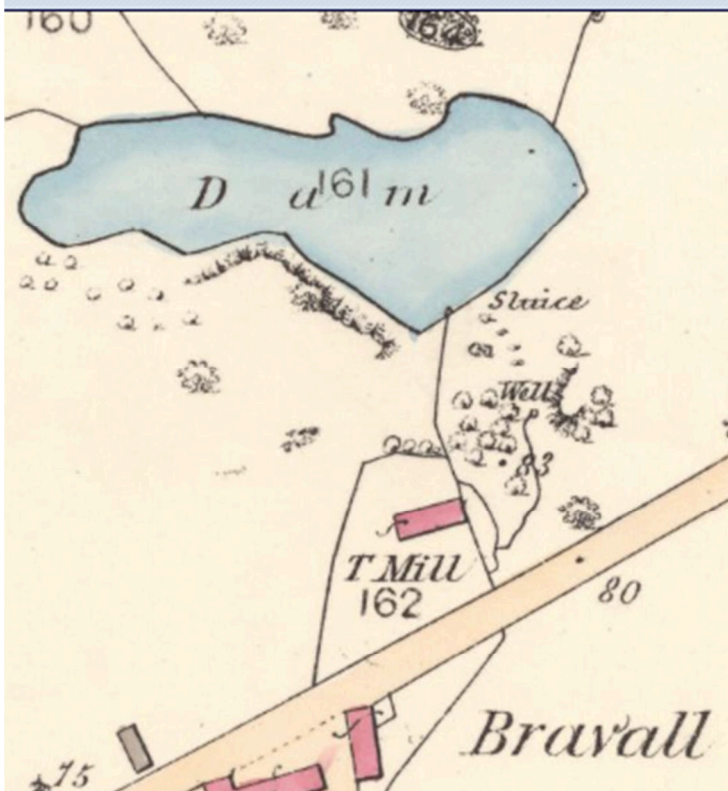


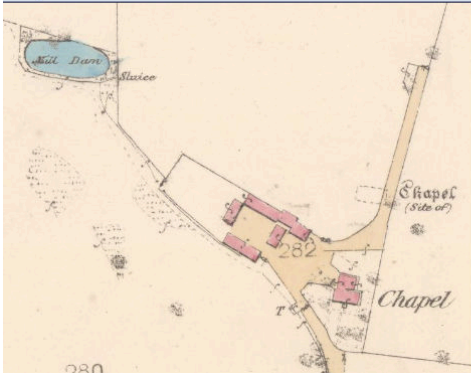
Figure 4c

A striking feature of the OS mapping in Scotland is in fact how few threshing mills seem to have been labelled, especially when the abundance of mapping and labelling of 'Mill Dams' and 'Sluices' must mean that many farms had a water-powered threshing mill in the farm buildings. Chapel farm near Dunscore in Dumfriesshire is a good example (*figure 5*) and three of many other examples are given in *figure 6* (p 11). The mapping of the arable areas of north-eastern Scotland is notable for showing many farms having a small dam with a sluice or sluices. Good examples of such mapping can be seen by browsing on the National Library of Scotland Maps website around the locality of North Commony in Aberdeenshire (NJ869485).

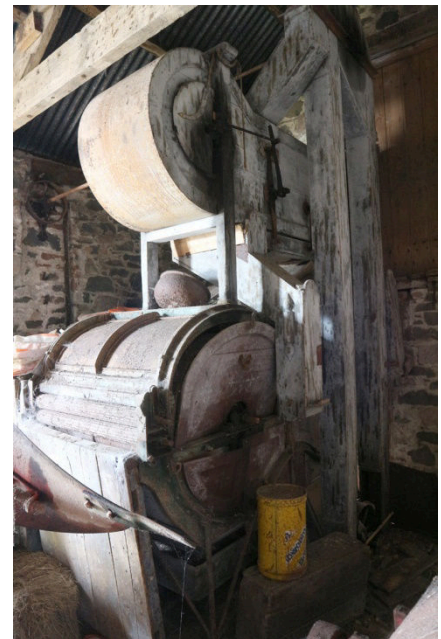


Dumfriesshire XL.9 (Dunscore)  
 Survey date: 1856 Publication date: 1856  
 Size: map 64.4 cm x 96.6 cm (25.344 x 38.016 inches), on sheet ca. 76

Survey > 25 inch to the mile, 1st edition, 1855-1882



*Figure 5: Left: OS first edition 25-inch mapping of Chapel farm near Dunscore showing the mill dam and sluice, with the lade (single line) leading to the unrepresented overshot water wheel and unlabelled threshing barn (above right). The water wheel is connected through the wall of the barn to the thrasher inside the barn (right). The sheaves were fed into the rollers at middle left and threshed in the lower drum, and elevated to the upper drum where the grain was winnowed. The lade at Chapel is piped and the second edition 25-inch mapping has a diagrammatic representation of the water wheel.<sup>6</sup>*



The supposition that relatively few farm-based threshing/thrashing mills were labelled by the OS is confirmed by recent detailed work by brothers, Drs Alastair and Tom Robertson.<sup>7</sup> This research is different from our OS-only based work, in that the Roberstons used multiple sources for their survey back to the 1750s, including, but not only, the National Library of Scotland (NLS) Watermills website being developed by the NLS's Chris Fleet and Glasgow PhD student Ms Iara Calton.<sup>8</sup> The NLS Watermills website has identified 240 threshing mill sites across Scotland, based on labelled threshing mills plus sites in Historic Environment Scotland's Canmore data-base and others that were picked up in passing and which can be inferred to have had a threshing mill, based of the presence of dams and sluices related to a farm steading. For the river systems of Dumfriesshire and Galloway, for example, Alastair and Tom Robertson, using the multiple sources and systematically examining every river or burn in the river

<sup>6</sup> Paul Bishop, *Sheetlines* 120 (2021), fig. 10.

<sup>7</sup> Reported at <https://historicaljourneysalongbritishrivers.com/>

<sup>8</sup> <https://maps.nls.uk/projects/mills/#zoom=6&lat=57.4000&lon=-3.7300>

networks, identified 976 threshing watermills in what were just three of Scotland's historic counties.<sup>9</sup> Notwithstanding the fact that the Robertsons' research extends back to 1750, it seems clear that the Robertsons' careful examination of every stream in the river systems of Dumfriesshire and Galloway has identified far more threshing (thrashing) mills than were labelled by the OS and/or picked up from Canmore or in passing in developing the NLS Watermills website. In other words, the OS did not label all threshing mills based in farm steadings.

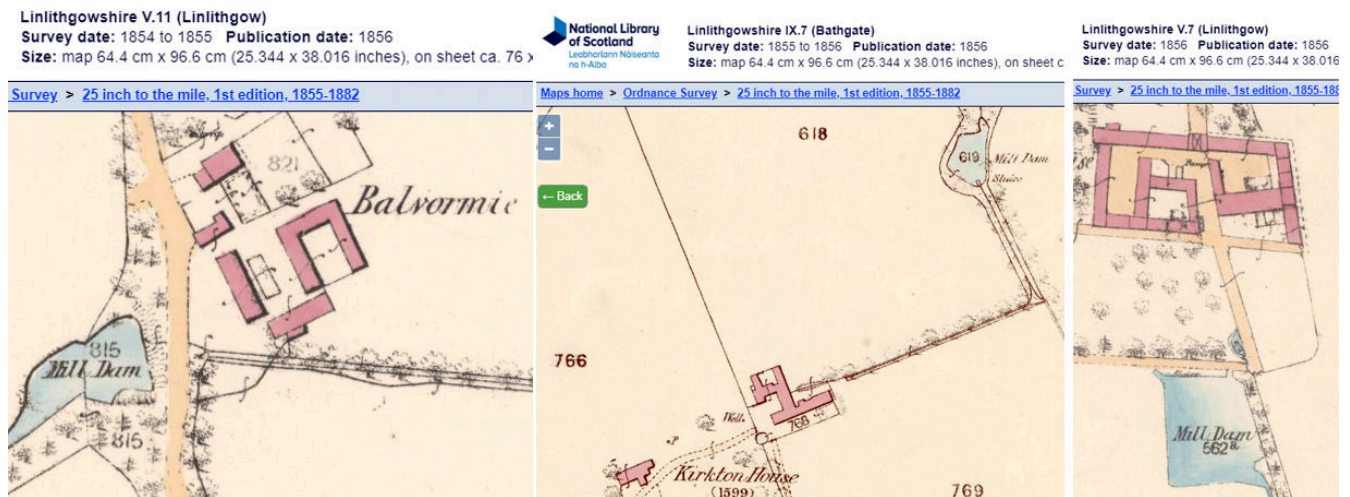


Figure 6 (see p9): Left: Balvornie; Middle: Kirkton House; Right: Preston House (all modern West Lothian). Three examples of first edition 25-inch OS mapping of farm steadings that each almost certainly included a threshing mill, as indicated by the labelling of a mill dam, a sluice in the middle example, and a single line from the mill dam to the steading that can be interpreted in each case as a mill lade.<sup>10</sup> The second edition 25-inch mapping of both Balvornie (left) and Preston House (right) includes the labelling of a sluice at the head of the lade where it leaves the mill dam.

### ***The horse gin (engine, house, walk, course, gang, mill etc)***

As already noted, grain threshers were also driven by animal power, generally by horses walking in a circle and attached to the arms of a mechanism that drove the thresher in an adjacent barn. The mechanism to which the horses were attached in a circular walk could be roofed or in the open air. If the circular walk was in the open air, the drive to the barn was underground (*figures 7*), whereas in a roofed walk the drive was generally overhead to the adjacent barn (*figure 8*).<sup>11</sup>

<sup>9</sup> See the Addendum at <https://drtomsbooks.files.wordpress.com/2021/04/8.-overview-of-the-watermills-of-galloway.pdf>

<sup>10</sup> Paul Bishop, *Sheetlines* 120 (2021).

<sup>11</sup> Paul Bishop, 'Horse gins in Baldernock, East Dunbartonshire', *op.cit.* has more detail on the mechanisms plus illustrations of the interesting architecture/construction of the roofed horse gins.





Figure 7: Images of two open-air horse gins in Northern Ireland that show some of the mechanism. Left: Excavation of the open-air horse gin at Creevyloughgare, Saintfield, County Down, showing the subsurface structure including the underground trough that carried the drive shaft to the adjacent barn.<sup>12</sup> Right: The arm of the open-air horse gin at Greenhill, Annahilt, County Down, also with parts of the mechanism visible half-way back towards the building and at the base of the building itself. This horse gin drove a creamery churn and the linear diagonal and vertical structures at centre on the farm building wall are parts of the mechanism to transfer power to an overhead drive at the churn.<sup>13</sup>

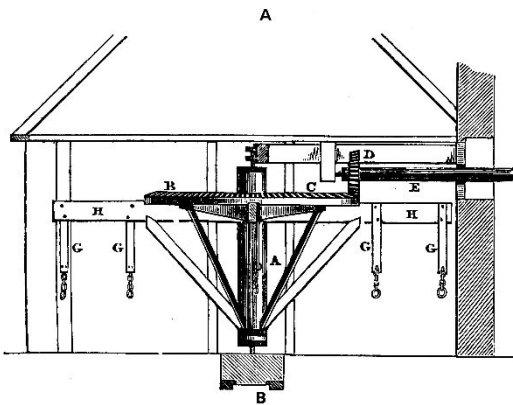


Figure 8 (left) : The mechanism of a roofed horse gin. Horses were yoked (G) to the driving beam H. As they walked round, power was transmitted by the gearing to the drive shaft and through to the thresher in the barn at right.<sup>14</sup>

The OS seems mostly to have represented open-air horse gins as a dashed circle with a dot at the centre, representing the circular walk around a central pivot (figures 9 and 10). There are examples, however, of a full circle with a dot at the centre, perhaps indicating low walling around the horse walk.<sup>15</sup>

<sup>12</sup> Harry Welsh, 'Horse gin, Creevyloughgare, Saintfield, County Down', *Ulster Archaeological Society Survey Report* 56 (2016), Figure 06.

<sup>13</sup> Ian Gillespie, 'Survey of Greenhill, Annahilt, Co. Down', *Ulster Archaeological Society Survey Report* 5 UAS 06/05 (2007), Figure 29.

<sup>14</sup> Source: Alexander Fenton, *Scottish Country Life*, John Donald, 1976, Figure 40b.

<sup>15</sup> For example, at <https://tinyurl.com/bu2d2467>



Figure 9 : Left, Central pivot post of open-air horse gin and adjacent barn at Wester Kittochside, near East Kilbride (now Scotland's National Museum of Rural Life). Centre, Second edition 25-inch mapping of what appears to be two open-air horse gins at Wester Kittochside. Right, 25-inch mapping on the edition of 1912 of one open-air horse gin as shown in the picture at left. The dashed circle symbol is of apparently larger diameter than that mapped on that spot in the second edition but that could perhaps reflect poor surveying and/or drawing.<sup>16</sup> A horse gin is not shown on the first edition 25-inch mapping of Wester Kittochside.



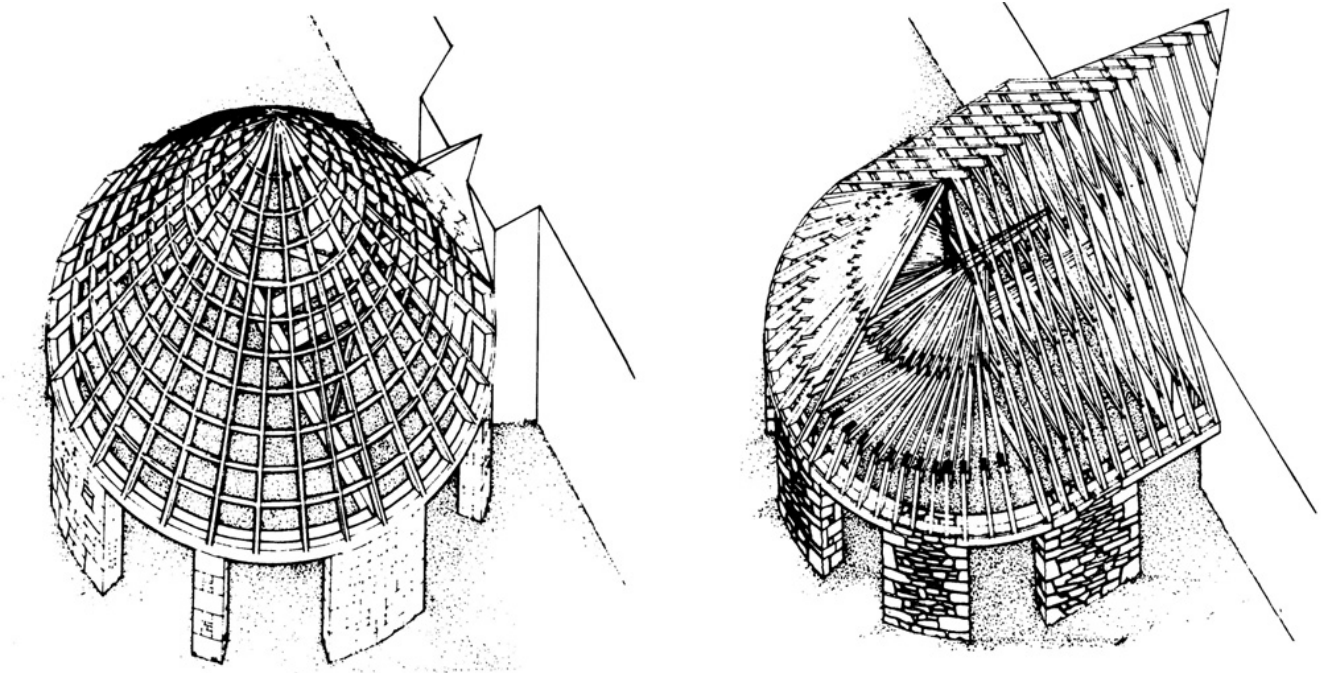
Figure 10 : Left, Open-air horse gin at Loch Farm, modern East Dunbartonshire (image courtesy of Don Martin and reproduced with the permission of East Dunbartonshire Archives & Local Studies). Right: OS 25-inch second edition representation of the open-air horse gin at Loch Farm.

Roofed horse gins generally have one of two main 'footprints' as would be mapped, namely, a circular or polygonal structure that is tangential to the adjacent threshing barn, or an apsidal (half-round) structure, consisting of a semi-circular structure attached to the adjacent barn by two parallel straight walls (as in

<sup>16</sup> pers. comm Richard Oliver, email 2 August 2021.



a modern, half-circle conservatory or the apse of a church, hence the name) (*figure 11*). The polygonal tangential form can consist of from four walls (square or diamond footprints) up to eight walls (octagon). The roof of a tangential structure can be conical (as in *figure 11 left*) or segmental consisting of triangular planes. A conical roof does not imply a circular footprint and nor does a segmental roof imply a polygonal footprint.<sup>17</sup>



*Figure 11: Isometric drawings of the circular (tangential) horse gin type (left) and the apsidal (half-circle) type (right). In these examples, the tangential structure (left) has a circular footprint whereas the apsidal appears to have a polygonal footprint, with straight wall segments. The gaps between the wall segments are for air circulation to cool the working animals.<sup>18</sup> Fenton and Walker have suggested that most horse gins were located on the north side of the adjoining barn, to aid the cooling of the horses<sup>19</sup>, but such a north-side preponderance has not been particularly noted in the (unsystematic) survey of horse gins for this paper.*

The distinctive footprints of horse gins means that they are generally obviously depicted in mapping (*figure 12*) and there is a long history of such representation (*figure 13*). The examples in *figure 12* mean that we can have confidence in using OS mapping to identify former horse gins but a note of caution relates to semi-circular architectural elements. These are not uncommon in houses in Scotland where they mark stair-wells or other architectural features (*figure 14*). The *figure 14* caption indicates one way in which such architectural elements can be distinguished from a horse gin, and the diameter of such an element, versus the typical diameters of horse gins, should also be a guide. As I

<sup>17</sup> See Paul Bishop, 'Horse gins in Baldernock, East Dunbartonshire', *op.cit.* for more detail.

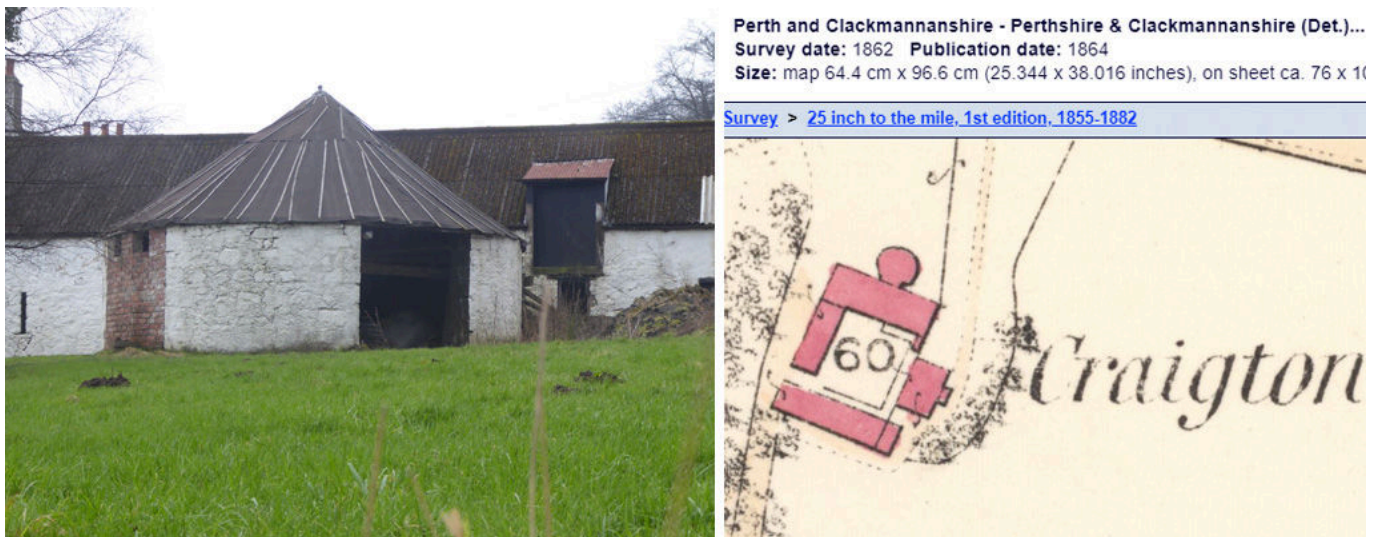
<sup>18</sup> Source: Alexander Fenton, *Scottish Country Life*, John Donald, 1976, Figure 41.

<sup>19</sup> Alexander Fenton and Bruce Walker, *The Rural Architecture of Scotland*, John Donald, 1981, p.173.

have noted elsewhere in relation to a small sample of the 15 horse gins in Baldernock Parish:

Diameters of all Baldernock gins were measured to a precision of 0.05 mm with a vernier caliper on the [paper] 25-inch sheets and converted to the imperial units that operated when the gins were built. They are not reported here with any more precision than as a range because of uncertainties that attach to the surveying, cartography and engraving of the maps, as well as to distortions of the paper on which the maps were printed. That said, the frequency distribution of measured gin diameters is: 22-27 feet: five; 27-32 feet: three; and 32-37 feet: seven. The diameter of the half-circle portion of the Wester Blairskaith gin [figure 11 here] was measured on both Google Earth and the 25-inch sheet as 30 feet, and so it is likely that the diameters as measured from the 25-inch maps are broadly accurate.<sup>20</sup>

Measured diameters of horse gins in an area with an equivocal semi-circular feature attached to the side of a building will help to clarify the nature of that feature.



*Figure 12a : the extant circular horse gin on Craigton farm near Stirling (image courtesy of Jim Beck) and its representation on OS first edition 25-inch mapping.*

<sup>20</sup> Paul Bishop, 'Horse gins in Baldernock, East Dunbartonshire', *op.cit.*, p.26.

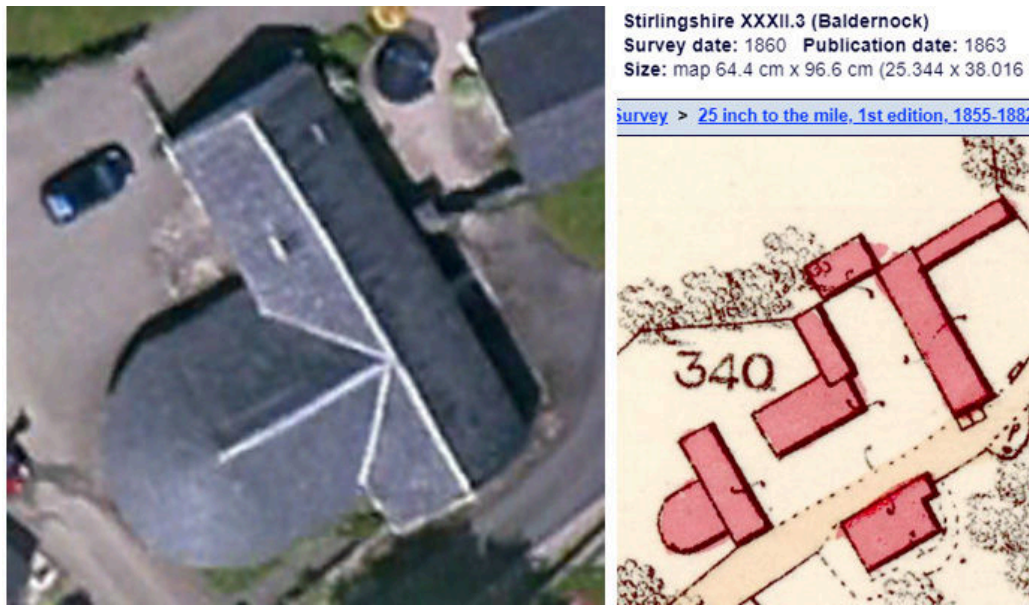


Figure 12b : Google Earth image of the extant apsidal horse gin at Wester Blairskaith in Baldernock (modern East Dunbartonshire) and its representation at bottom left on OS first edition 25-inch mapping.

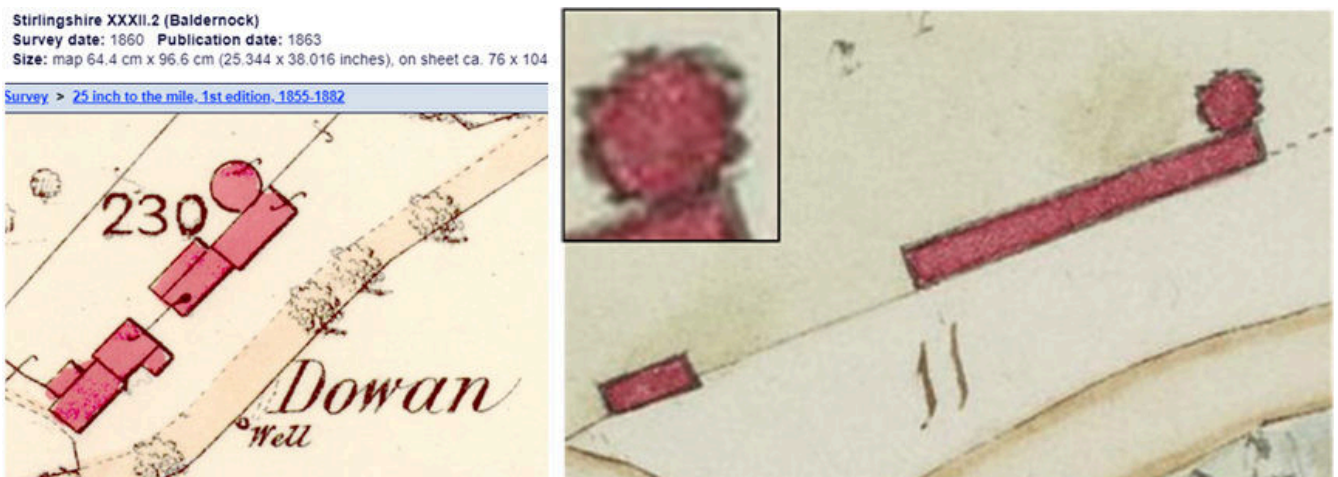


Figure 13: Left, Dowan Farm house and steading, Baldernock (modern East Dunbartonshire), on OS first edition 25-inch mapping, showing circular horse gin at centre top. Right, Dowan Farm house and steading on an 1805 plan of farms on Dougalston Estate. Note circular horse gin at top right. The circular outline of the horse gin (enlarged upper left) is apparently represented in a dot-dash symbology that can be interpreted to represent the alternating columns and ventilation openings in the gin's walls (cf. figure 11). The small farm-house at left in main image has a 1797 date stone over the former front door and the steading has been much added to between 1805 (right) and 1860 (left). (The extract of the Plans of the Estate of Dougalston, Dunbartonshire & Stirlingshire dated 1805 (National Records of Scotland RHP5302/4 'Dowan'), from the records of Thomson & Baxter WS, is published with the permission of Gillespie Macandrew LLP as successor legal firm to Thomson & Baxter WS.)



Stirlingshire XXXII.3 (Baldernock)  
 Survey date: 1860 Publication date: 1863  
 Size: map 64.4 cm x 96.6 cm (25.344 x 38.016 inches), on sheet ca. 76 x 104 cm

Stirlingshire XXXII.3 (Baldernock)  
 Revised: 1896, Publication date: 1897  
 Size: map 64.4 cm x 96.6 cm (25.344 x 38.016 inches), on

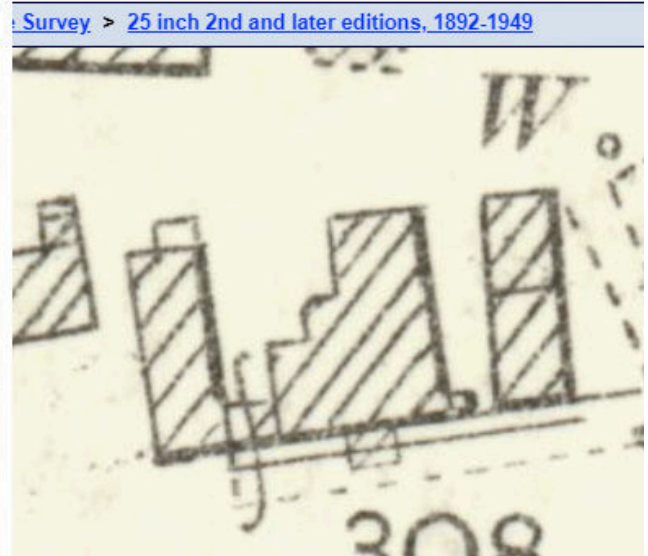


Figure 14 : Baldernock Parish's North Bardowie farmhouse and steading on 25-inch mapping by the OS – left is first edition and right is second. In the first edition map, note the open-air horse gin at bottom left (evidently with solid walls) and the apsidal form on the north wall of the central building (the farmhouse). That this apsidal form is not a horse gin is confirmed by its size compared with that of the horse gin. This apsidal form is also clearly part of the house because it was partially incorporated into the east wing of the house that was added in the second half of the 19th century. The horse gin has disappeared by the second edition but evidence of its having been cleaned off the plate that was used to print the second edition appears to be faintly visible as a series of small random marks approximating a circle where the gin was located in the first edition.<sup>21</sup>

The instruction to OS surveyors, that ‘the line surveyed will be the perimeter of the building at ground level’<sup>22</sup>, means that OS mapping should indicate clearly whether the gin building was circular or polygonal. OS maps do show gins with polygonal forms and so it is clear that (at least some) surveyors followed the directive to map the building’s form at ground level (*figure 15*). I say ‘at least some’ in the preceding sentence because the ground-level footprint of, for example, the Wester Blairskaith gin in Baldernock is polygonal whereas the

<sup>21</sup>As Richard Oliver has noted (pers. comm. email 2 August 2021), this is an odd situation in that it is clear from the map itself (i.e., one does not need to know the details of the history of OS mapping) that the second edition map has been completely redrawn. In other words, if there were no horse gin at the locality at that time then it should not have been on the plate. My conjecture (and certainly not one communicated to me by Richard) is that perhaps short-cuts had been taken and when the mistake was realised, the non-existent horse gin was cleaned off.

<sup>22</sup> Quoted by Richard Oliver, *Ordnance Survey Maps: a concise guide for historians*, Third Edition, CCS, 2013, p.89.

map shows it as (semi-)circular (*figure 12b*). Perhaps the field surveyor made a mistake or the draughtsman ‘smoothed’ the footprint.

**Linlithgowshire V.8 (Linlithgow)**

**Survey date:** 1854 to 1855 **Publication date:** 1856

**Size:** map 64.4 cm x 96.6 cm (25.344 x 38.016 inches), on sheet ca.



*Figure 15 : Hexagonal (left) and circular (right) horse gins on adjacent farms near Linlithgow, modern West Lothian.*

### ***‘Thrashing machines’ on 6-inch mapping***

The foregoing makes it clear that horse gins are readily identifiable by their footprint, and so not needing labelling, whereas water-powered threshing mills are less obvious yet often unlabelled. However, first edition 6-inch mapping of parts of Edinburghshire (modern Midlothian), which were completed when the 6-inch was still the basic scale of survey, do label horse gins, as ‘Thrashing machines’ (eg, *figure 16* from Sheet 4). Sheet 5 also has many examples of such labelling, applied to both circular and apsidal buildings attached to steadings. This practice is a little curious in light of the fact that the horse gin is generally readily identifiable by its footprint. However, there are some farm steadings with the ‘Thrashing Machine’ label and no obvious horse gin footprint (*figure 17*). I take the use of ‘machine’ and not ‘mill’, along with the lack of the dam and sluices infrastructure of a water mill, to mean that ‘machine’ here indicates a horse gin. Conversely, sheet 4 of Edinburghshire first edition 6-inch mapping includes at least one farm (West Langton) that has an obvious circular horse gin without a

‘Thrashing Machine’ label. And finally, there is at least one farm with a mill lead – Newfarm – that is labelled, as would be expected, ‘Thrashing Mill’ (*figure 18*).

Edinburghshire, sheet 4 (includes: Ecclesmachan; Kirknewton; Liv...  
 Survey date: 1852, Publication date: 1853  
 Size: map 61 x 92 cm (ca. 24 x 36 inches), on sheet ca. 70 x 100 cm (28 x 4

[Survey](#) > [Six-inch 1st edition, 1843-1882](#)



*Figure 16 : Three labelled ‘Thrashing Machines’ (top middle, middle left and bottom right) on the first edition 6-inch mapping (modern Midlothian). The 6-inch was the basic scale of survey at this time.*

Edinburghshire, sheet 4 (includes: Ecclesmachan; Kirknewton; Liv...  
 Survey date: 1852, Publication date: 1853  
 Size: map 61 x 92 cm (ca. 24 x 36 inches), on sheet ca. 70 x 100 cm (28 x

[Survey](#) > [Six-inch 1st edition, 1843-1882](#)



*Figure 17 : Millrig farm steading in modern Midlothian with a ‘Thrashing Machine’ label and no obvious horse gin footprint.*



Edinburghshire, sheet 4 (includes: Ecclesmachan; Kirknewton; Liv..  
 Survey date: 1852, Publication date: 1853  
 Size: map 61 x 92 cm (ca. 24 x 36 inches), on sheet ca. 70 x 100 cm (28

Survey > [Six-inch 1st edition, 1843-1882](#)

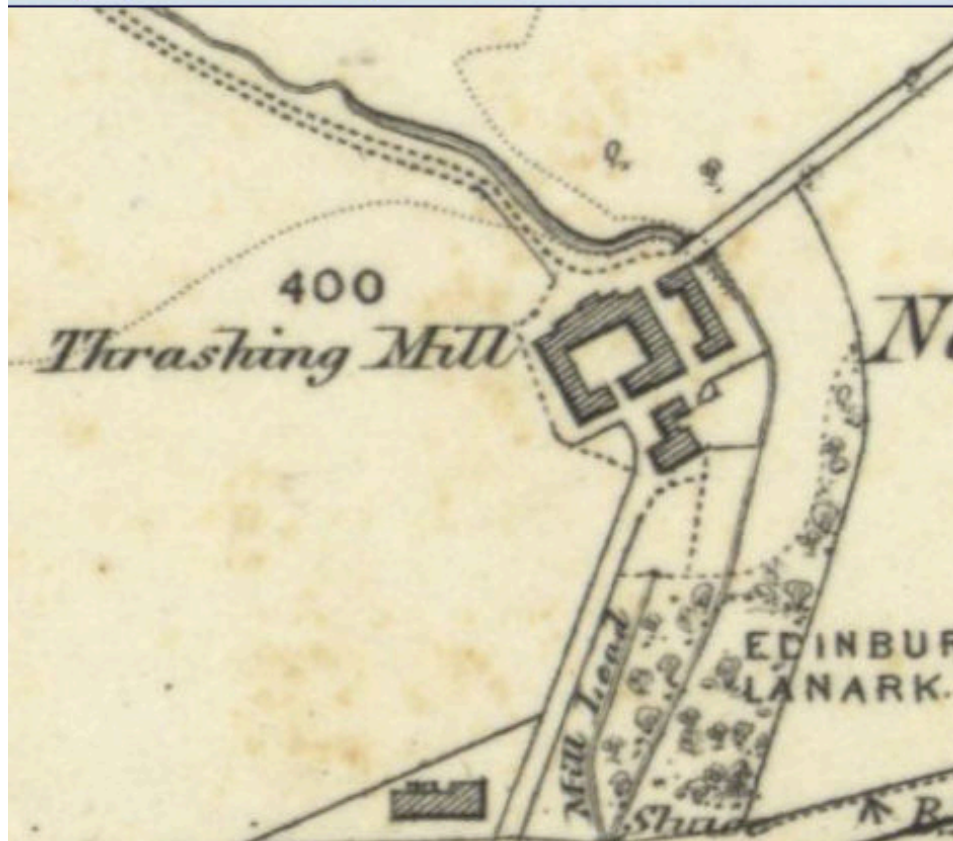


Figure 18 : Thrashing Mill with mill lead on Newfarm in modern Midlothian.

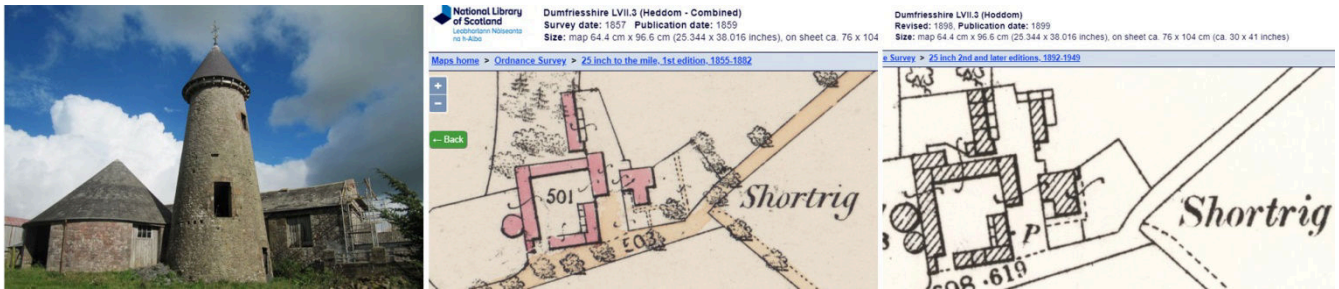
### **Wind power**

Andrew Gray's *Explanation of the Engravings of the Most Important Implements of Husbandry Used in Scotland* (1814) includes a detailed diagram of the engineering for having a thresher powered by both a wind mill and a horse gin<sup>23</sup> but it seems that wind was used only rarely to power threshing mills in Scotland. John Hume reported nearly 45 years ago that there were only ten mills extant in Scotland that had been used for threshing and that these were an important part of Scotland's rural industrial heritage, being "one of the original modes of threshing-mill drive."<sup>24</sup> The OS labelling of by far and away the bulk of the 178 wind mills identified by the NLS Watermills website explicitly identifies them as for pumping. One example is known of such combined wind- and horse-powering of a thresher, Shortrigg (current spelling) in Dumfries and Galloway,

<sup>23</sup>Andrew Gray, *Explanation of the Engravings of the Most Important Implements of Husbandry Used in Scotland*, Edinburgh, 1814. Available from Google Books at <https://tinyurl.com/3pxeu46d>

<sup>24</sup> John Hume, 'Scottish windmills: A preservation policy', *Vernacular Building* 5 (1979), 36-43.

but this example is not explicitly labelled by the OS to reveal the function of the windmill (*figure 19*).



*Figure 19 : Shortrigg farm in modern Dumfries and Galloway. Left: View from the southwest of the horse gin and windmill tower, which powered the thresher in the barn at rear (from the British Listed Buildings website : image by Chris Wood-Gee and its use licensed under the Creative Commons Attribution licence). Middle: OS 1st edition 25-inch mapping showing the windmill tower only. Right: OS 2nd edition 25-inch mapping showing the windmill tower and the larger-diameter circular outline of the horse gin immediately to the north of the tower.*

### **Final thoughts**

OS mapping of threshers in Scotland is somewhat patchy, especially in relation to the labelling of water-powered threshing mills. This is not to complain about a shortcoming but simply to note that caution is needed when using OS mapping to assess past land use, particularly when it is acknowledged that mapping land use was not the objective of the OS's work. As well, this apparent shortcoming presumably also reflects the surveyor's difficulty in knowing whether there was a thresher in a barn, especially if the water-wheel that powered that thresher was enclosed. But obvious cases of water-power with an external unenclosed water-wheel, as at Chapel farm (*figure 5*), were not identified as driving a grain thresher. In other cases, however, the thresher in the barn was known about (*figures 2-4*).

It seems clear that the horse gin has such a distinctive footprint (plan-view shape) that the researcher should be able to identify most examples and draw the appropriate conclusions about past land use. Once the horse gin is superseded, then the conclusions become more speculative, as is illustrated by pre-OS mapping of the Porterstown farm in Dumfriesshire (*figure 20*).



*Figure 20 (see overleaf)*

Figure 20 (previous page) : Porterstown farm (modern Dumfries and Galloway) in (left) an anonymous map of 1820, (middle) a map of 1823 by W&D Crawford, and (right) a map of 1845 by McCallum & Dundas. Note that the horse gin has disappeared by 1845, replaced, it is assumed, by a water-powered thresher, as indicated by the presence of a mill pond and lade. The same arrangement as in 1845 is shown on the OS first edition 25-inch mapping. The 'invisibility' of the water-powered thresher is evident once again. It is worth noting that the stack yard, where built stacks of grain to be threshed were stored prior to threshing, were routinely identified on pre-OS maps (as here) but OS did not continue this practice and nor did McCallum & Dundas in their 1845 map above (right). A hint as to what took place in the building adjacent to the stack yard was therefore lost. (Plans published by the permission of the Duke of Buccleuch and Queensberry KT and courtesy of the Dumfries Archival Mapping Project [DAMP] and the National Library of Scotland)

A further area of uncertainty arises when a farm is mapped with a horse gin and a (mill) dam and lade and/or as having two gins (figures 21 and 22).

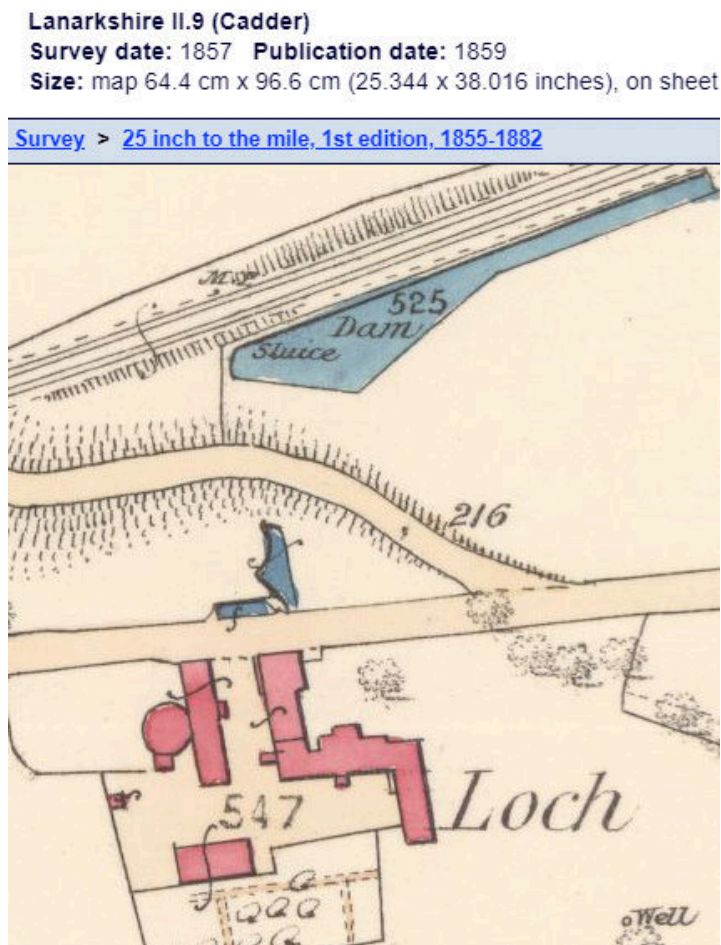


Figure 21 : Loch farm on the 1st edition 25-inch mapping, showing a dam and sluice as well as a roofed horse gin. See figure 10 for the second edition mapping, by which time the gin had been relocated to an open-air position and the dam and sluice were still present.



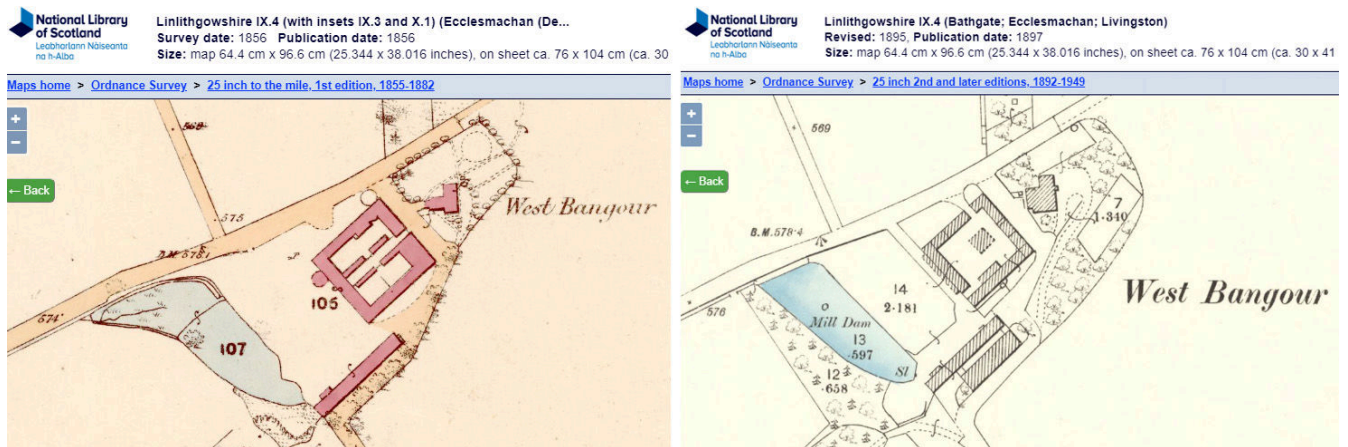


Figure 22 : West Bangour farm (modern West Lothian) on (left) the first edition 25-inch mapping and (right) second edition 25-inch mapping, showing that in the 1850s (left) the farm had a dam and (presumed) lade plus two horse gins, one roofed and one unroofed. By the 1890s (right), the dam is explicitly labelled as a mill dam with a sluice and the unroofed horse gin at upper centre had apparently taken on a more apsidal footprint.

So, what can we conclude concerning threshing technology in Scotland in the mid-19th century and subsequently? Notwithstanding uncertainties in the mapping and labelling of threshers, we see threshing technology changing through time. Thrashing mills are converted to other uses, and in the case of Shortrigg farm, a horse gin apparently replaced a windmill for threshing (*figure 19*). We see indications of individual farms using both horse gins and watermills for threshing, which was not expected at the start of this review of the mapping of threshing and might reflect the fact that a horse gin acted as a back-up to a water mill during periods of low river flow. It is not yet clear whether horse gins largely replaced watermills or vice versa, and careful examination of estate plans might reveal overall trends. For example, 1834 plans of Rehal farm in Dumfriesshire (modern Dumfries and Galloway) indicate the intention to replace a horse gin by a water-powered threshing mill (*figure 23*). A note on the plan indicates that the annotations in red are for the farms “as they are intended to be after various improvements are accomplished.” Two reserved rights are shown in red “for proposed mill ponds”, one of which is shown in *figure 23* along with the horse gin overprinted in red presumably as part of the gin’s abandonment and the adoption of a water-powered threshing mill. The OS first edition 25-inch mapping in 1857<sup>25</sup> shows that the changes mooted in red in *figure 23* for Redhall (‘Redhouse’ by the mid-19th century) were indeed made and that by 1857 the mill dam had been infilled with sediment, though its outline was still clear. Perhaps a further shift in technology to power the thresher had been made by the mid-19th century.

<sup>25</sup> <https://maps.nls.uk/view/74944228#zoom=6&lat=4436&lon=9679&layers=BT>

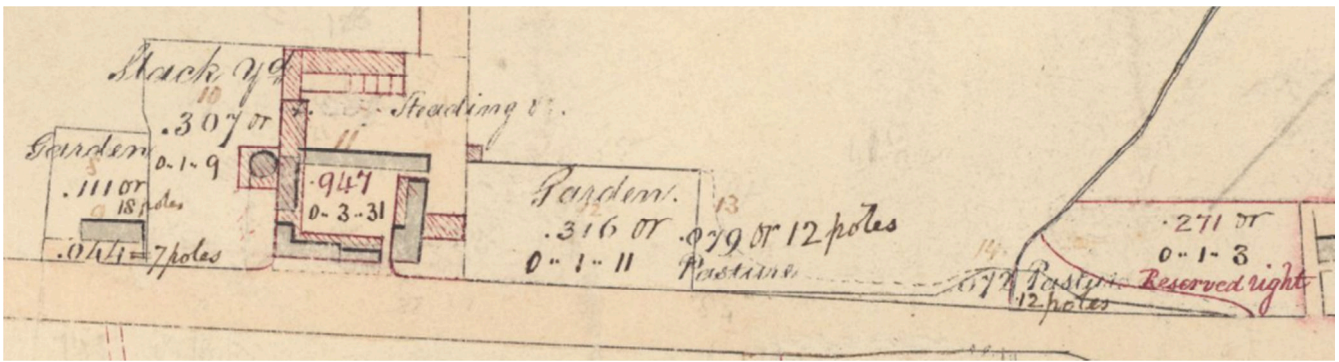
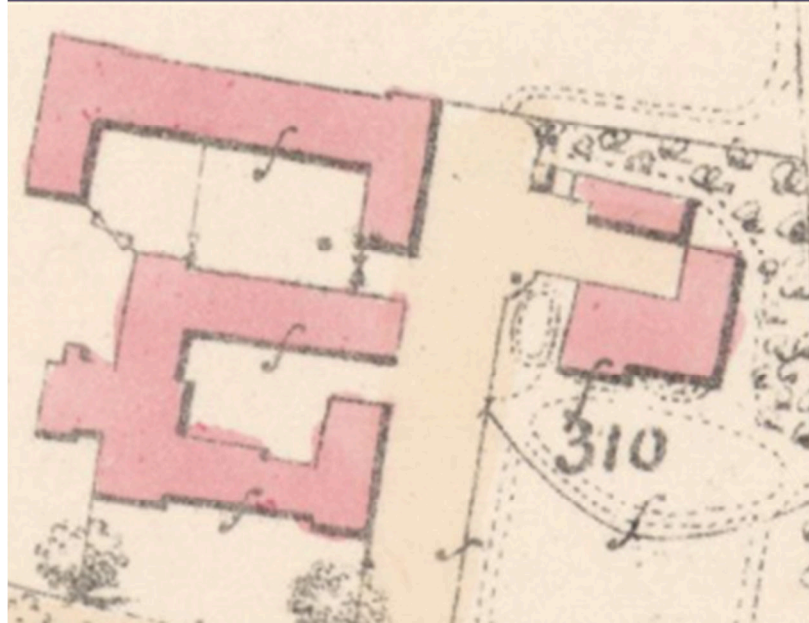


Figure 23 : Redball farm in modern Dumfries and Galloway with annotations in red to indicate proposed changes including the 'Reserved right' (at bottom right) for a mill dam. Note how the stack yard was located beside the horse gin.

OS mapping of Scotland did not necessarily 'catch' the switch from flails to mechanised threshing, which began in the late 18th century, but it was able to document some of the subsequent changes in the technology that powered threshing. And as steam power became more widely available, it came to power threshing in some farms. Indeed, the OS can also help in understanding and documenting that shift, in that the OS Name Books for Scotland have been digitised and are searchable online.<sup>26</sup> Searching the Name Books by 'steam' yields many tens of returns, such as: 'A good corn mill Known by this name [Lady Mill in Aberdeen], with dwelling house store houses, offices yard, garden etc attached the machinery in Mill is propelled by steam & water power'; and 'This [Wester Duntarvie in West Lothian] is a large farm stead with dwelling house of two storeys and garden; the thrashing machine is driven by steam.' The first of these provides the useful information that both water- and steam-power are used, and the second confirms that a steam-powered thresher was housed in steadings at Wester Duntarvie (*figure 24*). Steam power did not necessarily leave any mapped indication of its use, except where the steam boiler was large and needed a chimney stack that would have been mapped. In other words, although the switch from flail to thresher was not generally picked up by OS mapping, threshing by water power or horse power was generally clear, courtesy of the distinctive footprints and/or symbology of those power sources (albeit that the surveyor did not always look into the stead to see if there was indeed a water-powered thresher on the other side of the wall from the water wheel). The switch to steam – from either a stationary steam engine housed in a farm stead or a mobile steam engine that moved from farm to farm – was not so evident, especially if the footprints and symbology of the former power sources persisted, but the final shift in technology, to the combine harvester, meant that all mapped indication of the technology of threshing disappeared.

<sup>26</sup> <https://scotlandsplaces.gov.uk/records>.

**Linlithgowshire VI.2 (Abercorn)****Survey date:** 1855 **Publication date:** 1855**Size:** map 64.4 cm x 96.6 cm (25.344 x 38.016[Survey](#) > [25 inch to the mile, 1st edition, 1855-188](#)

*Figure 24 : Wester Duntarvie farm, where the OS Name Book records that the thresher was steam-powered. Note how the thresher was not labelled and that there is nothing in the mapped footprint to indicate the use of steam power.*

### ***Acknowledgements***

Joe Rose's mammoth work in 'cleaning up' the GB1900 data for this mills work must be acknowledged again and is much appreciated. I am grateful to: Alistair Borthwick and Archie McConnel for access to the Chapel thresher (*figure 5*); Don Martin and East Dunbartonshire Archives & Local Studies for permission to use the image in *figure 10*; Jim Beck for the image in *figure 12*; Mr Robert Graham-Campbell, CEO of Gillespie Macandrew LLP, for providing permission to use the extract of the plan of Dowan Farm (*figure 13*); and the Duke of Buccleuch and DAMP for permissions to use the extracts in *figures 20* and *23*. I also thank Chris Fleet of the NLS Maps Library for his continuing support and help, as well as PhD student Iara Calton for her thoughts and insights on watermills. Richard Oliver provided very helpful advice on the first draft of this paper, for which I am grateful.