

RCAHMS

Dalmore, Stone Roasting and Grinding Works East Ayrshire 2014

NS42SW 19.03



General view East by John Hume, 1967 (SC682112)

Miriam McDonald, Industrial Survey, Architecture and Industry,
RCAHMS
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Background

This stone pulverising works was one of the Dalmore Estate industries set up or improved in the 19th and 20th centuries by J. C. Montgomerie and his successors. Built in two phases c. 1916-20, the pulverising works or crushing shed was a way of using waste from the Dalmore Mine which had been dumped in the [Dalmore Quarry](#). The waste stone that could not be used for hone making at the [Milton Mill](#) or [Dalmore Mill](#) sites was ground into powder and then sold on to Stewarts and Lloyds Ltd tubeworks at Coatbridge for mixing with tar for lining water pipes (Stewart and Lloyds, amalgamation of Lloyd and Lloyd Ltd and A and J Stewart and Menzies Ltd, 1903; eventually part of British Steel after 1967). The dust was also used for making battleship grey paint during World War 2. (1)

RCAHMS carried out a building survey of this building in 2013 as part of its Industrial Survey Programme.

Map Evidence

The Ordnance Survey (OS) maps give a good overview of the development of the Dalmore estate industries. The pulverising works first appears on the [1946](#) OS map (2) as two rectangular conjoined buildings but is un-named. It sits adjacent to the tramway running from the mine to Dalmore Mill. It is presumed that material was sent from the mine by tramway to the pulveriser and thence removed by road to the railway station at Tarbolton (Ayr to Mauchline Branch of the Glasgow and South Western Railway closed to passengers in 1943; still operated as a freight line). Latterly material was moved by lorry from the mine to the pulveriser when the tramway was pulled up.

[The Pulverising and Stone Roasting Works](#) (see [plan and section](#))

The building is of wood construction with a double-pitch roof of corrugated-iron and currently measures 17.2m in length (excluding the lorry part and the storage building to east) and 15.6m in width. It consists of three compartments, a fourth having been demolished. The south east compartment contains the pulverising machinery and rotary dryer and the west and north compartments were used for bagging, storage and plant. The covered lorry area is on the west side and measures 9.0m in length and 3.6m in width. This has begun to collapse.

The original drawings for the 'Dalmore Crushing Works Proposed New Shed' of 1920 held at South Ayrshire Archives (3) shows that the east part of the crushing and pulverising works was a later addition to the bagging area, engine house and coal house. This 1920 addition has been demolished, along with the stone store also shown in the drawing. The demolished range can be seen in the 1967 image taken by J R Hume (below, SC682112).

The furnace and elevator would have originally been under cover in this area, and there was a ventilator above the furnace. This range was of similar construction to the earlier build. The proposal drawing also indicated a first floor in the now demolished east range and an open stair to it between the shed and the coal shed adjacent (extreme right of 2013 image, DP170531 below) to give access to the upper floor. This upper floor would have allowed maintenance access to the

machinery at this upper level. The similarity to the proposal drawing and the 1967 image suggests that the missing range conformed closely to the architects drawings from June 1920. (4)



Left: works from east, 1967 [SC682112, 1967, John Hume Collection, HES], and right, in 2013 [DP170531, 2013, HES]. The lean-to shed (stone store) and the 1920 range (with window) attached are clearly visible (left). Both the shed and the building over the business end of the rotary kiln have been demolished. The concrete floor remains (visible, right).



Left: works from west, 1967 [SC682115, 1967, John Hume Collection, HES] with lorry access area, and right, in 2013 [DP170553, 2013, HES]

Machinery

Griffin Mill

The main piece of machinery in the pulverising works is the Bradley single roll [Griffin Mill](#) pulveriser with a 40 mesh sieve. This design was made from 1886 by the Bradley Pulverising Company of Pennsylvania and was widely used in USA and elsewhere. This machinery worked using a crushing roll against a fixed die under centrifugal force.

The Rotary Dryer

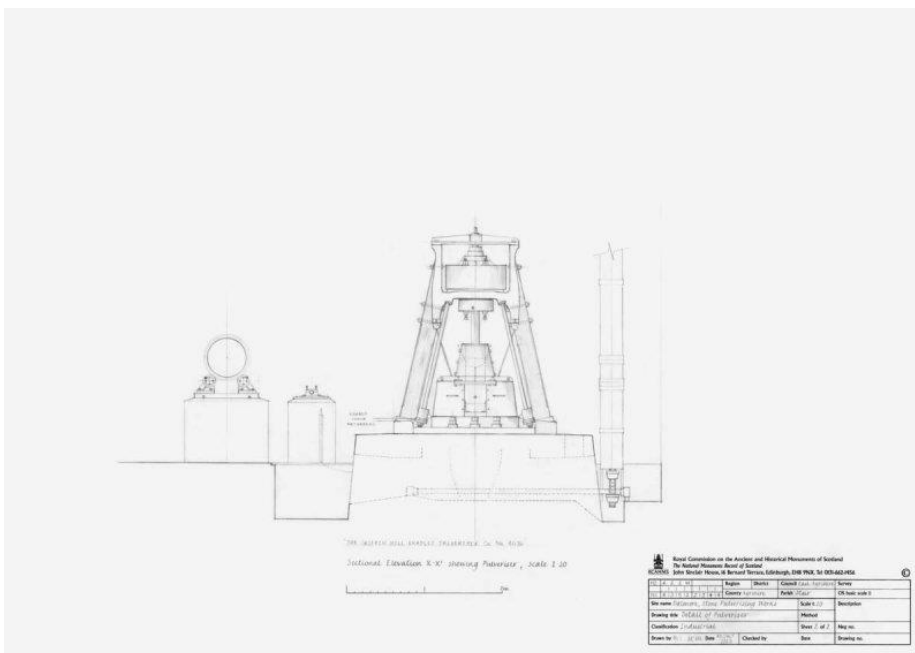
The Rotary Dryer dried the crushed stone prior to pulverising in the Griffin Mill was considered to be an economical form of drying apparatus. This consisted of a furnace attached to a long 'tube' which was brick lined. The heat would pass through the brick lining to the other end and thence

through the material to be dried, being exhausted through a fan. The material is constantly in motion (the tube turns), the vanes turning the material and the inclination of the dryer enabled the drying of the crushed material. The dried material was then expelled through a chute at the furnace end.



Above left to right: Drive shaft at Dalmore [DP170540, 2013, HES]; view of the Griffin Mill pulveriser (DP160205) - storage and former engine room from East showing the roof height difference between the two adjacent north sheds [DP170551, 2013, HES]

The motive power was an electric motor which drove the drive shaft. The complicated machinery in this part of the works was put in place to move stone from the crusher to the mill (to be pulverised) and thence to the bagging area.



Left: Elevation of 'Griffin Mill' [SC1366927, 2013, HES]

Process (see plan and flow diagram [SC1507112](#))

The process carried out at the pulveriser involves crushing, drying, milling, sieving, bagging and dispatch. An electric motor (A) operated the whole works through a main drive (B) and a system of belts, pulley wheels and gears. The rough stone was dumped on a concrete pad at NS NS43311 23343 (C) under a lean-to shed, now demolished.



Stone crushing and grinding works. Left to right: wooden planks which originally supported a crusher with the bucket elevator to right carrying crushed material to the top of rotary dryer [DP170536, 2013, HES]; the furnace which heated the rotary dryer with the bucket elevator to its right carrying dried crushed material to the pulveriser [DP170532, 2013, HES]; the rotary dryer, the rivets which attach the vanes to the interior of the dryer drum can be seen [DP170535, 2013, HES]

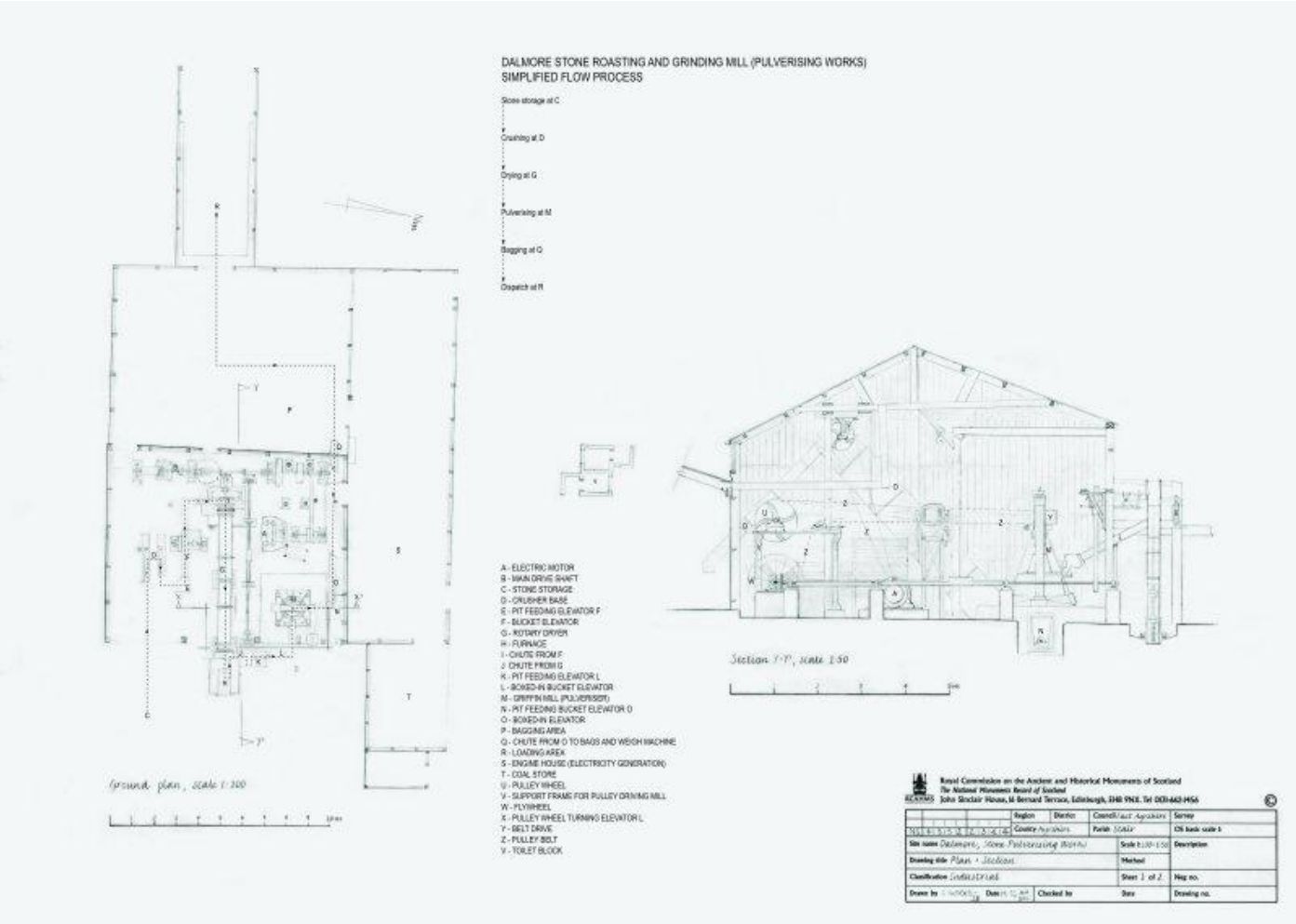
A stone crusher (D), now gone (only the wooden plank base remains) was hand-fed. The crushed stone was then dropped into a pit (E) from which a bucket conveyor (F) carried it to the top into the Rotary Dryer (G) with a furnace at the east end (H). The crushed stone then dropped via a chute (I) from the bucket conveyor into the west end of the dryer, the crushed material moved up towards the furnace end by vanes inside the body of the rotary kiln. The vanes are attached by rivets to the interior of the drum and can be seen on the outside of the kiln body.

The dried, crushed stone having been moved by the vanes to the west end of the furnace, was dropped via a chute (J) into an enclosed void (K) and thence into the bucket (L) elevator and into the pulveriser (M). The material once pulverised and put through a sieve, dropped into a pit (N) and then sent by elevator (O) to the bagging area (P). Any material not passing through the sieve would be re-fed into the pulveriser. The sacks were filled from a chute from the pulveriser's conveyor (Q), and put into 100 weight sacks, weighed at the weighbridge and the necks secured by a wire tie. These sacks were loaded in 10 ton batches at a time onto a lorry (R). The north compartment was where empty sacks were stored (S, former engine house).

The Stone crushing and roasting works at Dalmore was abandoned sometime after 1967. The buildings are in a state of decay, but its relatively intact pulverising machinery dating from the first quarter of the 20th century is a rare survival.



Above left to right: Weigh machine in bagging area from South West [DP170547, 2013, HES]; interior of lorry loading area from West (DP170544); building from North West [DP170545, 2013, HES]



Above: Plan and section of stone grinding and roasting/pulverising works machinery room [SC1507112, 2014, HES]

Acknowledgments

Thanks to Kenneth Montgomerie, owner of the Dalmore Stone crushing and roasting works and to Scott Morrison for arranging access to the site.

References

(1) Information from Mr Kenneth Montgomerie, owner, June 2013

(2) 6-inch map, Ayrshire, 1949, sheet XXXIV.NW

(3) South Ayrshire Archives, Auchincruive, Ayrshire, Montgomerie Archive, temporary item no. 47.5

(4) see Canmore

<http://canmore.rcahms.gov.uk/en/site/201938/details/dalmore+water+of+ayr+and+tam+o+shanter+hone+works+stone+roasting+and+grinding+mill/> EXTERNAL Reference: Architect: Allan Stevenson. 1916. Machinery Sheds, new, & Water Supply. Plans: at Darley Hay Partnership, Ayr

(5) <https://archive.org/stream/cu31924052263716#page/n195/mode/2up>

sent email to <http://ayr-south-ayrshire.cylex-uk.co.uk/company/darley-hay-partnership-17079633.html> 22/4/2014 at 16.30 re drawings of 1916.