



INDUSTRIAL SCOTLAND



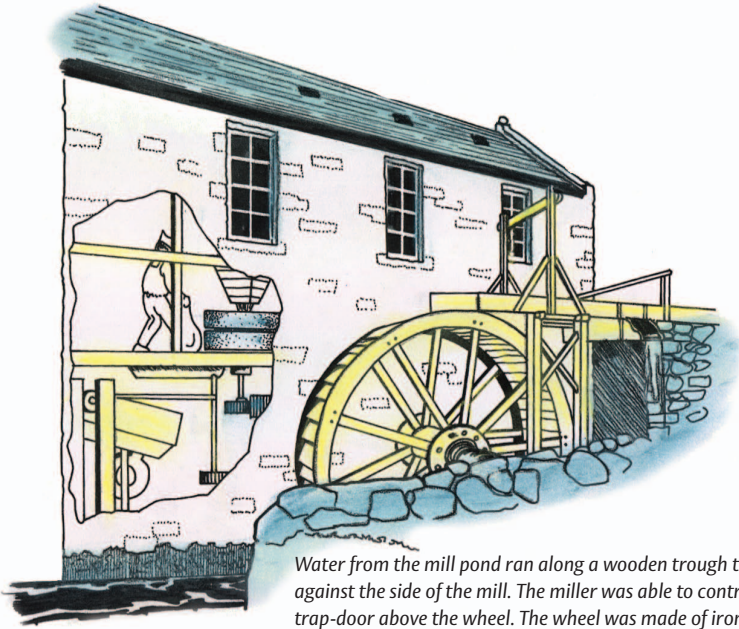
Central and southern Scotland in particular contains extensive industrial remains spanning the last three centuries, from the canals and harbour systems that were vital for transport, to the places in which ships were built, and buildings in which raw materials were transformed into products such as cotton. Bings like those on the front of this leaflet are evidence of the importance of mining, and the remains of the villages that were built to meet the domestic needs of the miners and their families are equally interesting and important as social documents of industry.

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The landscape is imprinted with the remains of crafts and industries, which made an enormous contribution to the social and economic development of Scotland. Until the 18th century most industries operated at a low level of production and supply. The terrain made transport of minerals and other raw materials difficult, and the most common early industries were leatherworking, spinning and weaving, grain milling, brewing and distilling. Early ironworks in the Highlands relied upon bog-iron, and their blast-furnaces were fuelled by charcoal made from local forests. Such bloomeries survive today as low grass-grown mounds of iron slag,

but often the mound protects the remains of the bowl-furnace.

The Act of Union in 1707 brought about the development of free market forces, reducing the cost of importing raw materials. Manufacturing industries flourished, as did the native iron and coal industries. The pace of industrialisation led to the Industrial Revolution of the late 18th century, characterised by the combination of capital, labour and technology, with large-scale production. This had a great impact on the development of the Central Belt. The 'pre-industrial' way of life persisted longer in the Highlands, but improved



Water from the mill pond ran along a wooden trough to the wheel set vertically against the side of the mill. The miller was able to control the flow of water by a trap-door above the wheel. The wheel was made of iron with wooden buckets into which the water fell and, according to the angle at which the buckets were set, turned the wheel either forwards or backwards. The waterwheel turned an axle, which was connected inside the mill to a series of interlocking cogwheels. These drove the pairs of millstones that ground the dried grain into meal.

communications brought change there too.

Water-mills for grinding corn have been known in Scotland since the 7th century AD. These were very small and the power was supplied by water



Small kilns are often found near abandoned agricultural settlements. Usually these were for drying grain, which often had to be harvested before ripening, but kilns of similar form were also used for making small quantities of lime. © Crown Copyright: RCAHMS. Licensor www.rcahms.gov.uk

running past wheels set horizontally. They were used in the Northern and Western Isles into the 20th century, where many survive as roofless shells beside steep water-courses. But from the 17th century, larger mills with vertical wheels enabled grain to be ground on a commercial scale.

Power from such water-mills was also used in the linen and woollen cloth industries and in the production of spades for agricultural use. Associated features include mill-ponds, lades or artificial water-courses, and sluice-gates to control the water flow.

Windmills were also used for grinding grain, and their circular stone foundations sometimes survive, even though the upper wooden chamber and sails have gone.



Attempts to improve poorly drained land in the 19th century led to a demand for clay tiles and pipes to create field drains. These were made in tile works, often in the vicinity of coal mines not just for the available fuel but also for the adjacent clays. Kilns could be round, or rectangular as here, built of brick, and they were fired by coal, with the chimneys providing the draught.

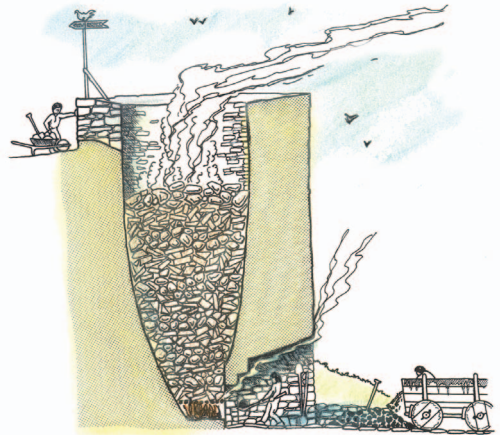
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One of the most important industries was mining. By the 1850s, Scotland was producing some 7.5 million tons of coal each year, and that figure rose to more than 42 million tons in 1913. Remains of this industry are still common, although mostly it is only the bings of waste material that survive (and these are steadily vanishing). Alongside the collieries, there are often traces of industries fuelled by coal, such as ironworks, limeworks, oil-shale works, brickworks and tarworks. All these industries were served by roads, bridges, canals and railways, and their workers were housed locally, often in new villages.

An important component of the Agricultural Improvements of the later 18th century was the practice of liming the fields in order to make them more fertile. Burning limestone produced pure lime which counteracted acidic soils. Limekilns are common survivals: both small-scale clamp kilns and the draw kilns of larger estates and commercial operations. Clamp kilns











consisted of U-shaped chambers, up to 10m long, which were formed either by digging into a hillslope or by building walls of turf or stone. Draw kilns were built of stone or brick against a hillside, making it easier to load at the top, and by the early 19th century banks of multiple kilns were being constructed. Most large-scale limeworks had gone out of use by the early 20th Century, for lime was replaced by modern fertilisers and cement ousted lime-mortar for building.

The fishing industry flourished, and burning seaweed (kelp) was important in the 18th and early 19th centuries. Fires were set in round or square stone-lined pits, and the kelp ash provided alkali for the glass and soap-making industries. Apart from harbours, the fishing industry also required shore stations with curing sheds. Industries allied to fishing are represented by saltworks, icehouses, and rope and net works.



A coal fire was set at the base of the shaft, beneath an iron grating, and blocks of limestone were layered alternately with peat in the shaft above. Once alight, the fire had to be stoked with more coal, and the entrance or vent kept an air-flow through the kiln and allowed the lime to be raked out at the end of the firing.

TIME-LINE

End of the last Ice Age Wildlife colonises land Mesolithic hunting settlers		12,500	
		8500	Flint scatters Shell mounds, rock shelters
Neolithic farming settlers		4000	Chambered tombs and houses Cupmarked rocks
		3000	Stone circles, henges, and standing stones
Metal technology (gold, copper)		2000	Burial mounds and short cists Hut-circles
Climate deteriorating Fortifications begin		1000	Burnt mounds Hillforts
Iron-working technology		500	Crannogs
		200	Duns, brochs, wheelhouses, and earth-houses
		BC ▲	
		▼ AD	
Roman army in Scotland		79	
Waning of Roman influence		200	Roman camps, forts and roads, Antonine Wall
		400	
Introduction of Christianity Picts, Gaels, Britons and Anglians		600	Long cist graves
Start of the Viking Age		800	Early Christian and Pictish carved stones, chapels
Emergence of Scottish nation		1000	Pagan Viking graves and settlements
		1100	
First burghs		1200	Stone-built churches
		1500	Mottes, abbeys, stone-built castles
Reformation of the Church		1600	Tower-houses
Agricultural improvements & Industrial Revolution		1800	Deserted villages and farms
		1900	Coal mines and heavy industries
Two World Wars		2000	Gun batteries and airfields

FRONT COVER PHOTOGRAPH:

Seen from the air, under a light covering of snow, each abandoned coalmine is marked by a crowsfoot shaped bing of waste material. The circular platform is the remains of a horse-engine, the winding mechanism driven by a horse that lifted both coal and miners out of the mine-shaft. The straight parallel lines are the remains of cultivation ridges.

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For advice and further information, please contact
Historic Scotland
Longmore House, Salisbury Place
Edinburgh EH9 1SH
Tel: 0131 668 8766
Email: hs.schedulingteam@scotland.gsi.gov.uk
www.historic-scotland.gov.uk

Historic Scotland is the agency within the Scottish Government and is responsible for administering the legislation that protects ancient monuments (buildings, ruins, archaeological sites and landscapes). It provides general advice on the conservation and protection of Scotland's heritage.

Historic Scotland's Education Service encourages the use of the built heritage as a learning and teaching resource.

Over 300 historic properties are looked after by Historic Scotland and are open to the public for enjoyment and education. For further information, including free leaflets, telephone 0131 668 8600.

Our data service website contains details of scheduled monuments and has GIS datasets available to download:
<http://data.historic-scotland.gov.uk>

The following leaflets are available from Historic Scotland:

Scheduled ancient monuments: a guide for owners, occupiers and land managers

Managing Scotland's archaeological heritage

Grants for Ancient Monuments: a guide to grants available for the preservation, maintenance and management of ancient monuments

Archaeology on farm and croft (produced jointly with Archaeology Scotland)

Scotland's listed buildings: a guide for owners and occupiers

The carved stones of Scotland: a guide to helping in their protection

Metal detecting - yes or no? Metal detecting, scheduled ancient monuments and the law

A leaflet on *Treasure Trove in Scotland* is available from the National Museums of Scotland, Edinburgh

A number of *Historic Scotland Technical Advice Notes*, on topics such as the use of lime mortars, the conservation of thatching and stonecleaning, are available. Catalogue from and orders to:

Historic Scotland Conservation Group
Tel: 0131 668 8638

e-mail:
hs.cgpublishations@scotland.gsi.gov.uk

This information leaflet is one of a series produced by Historic Scotland.

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