

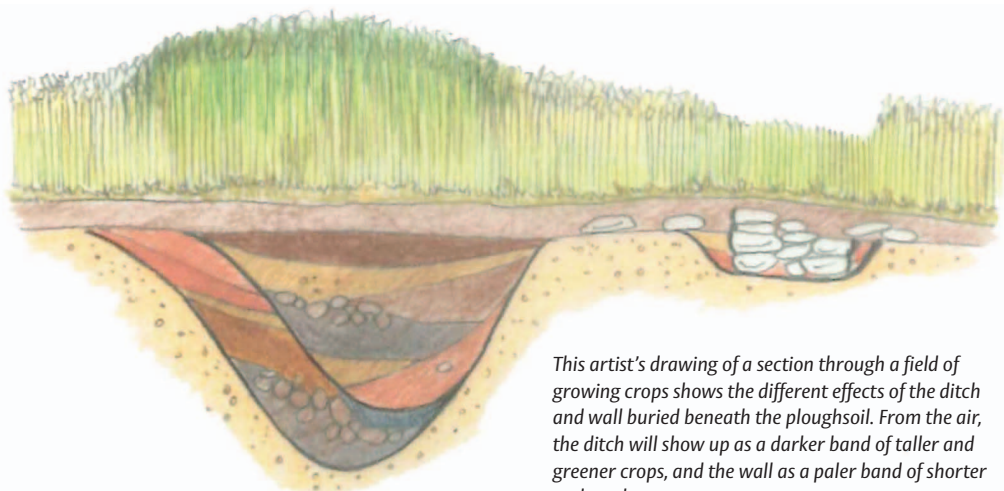


CROPMARK ARCHAEOLOGY

There is a huge amount of buried archaeology in Scotland's countryside. Sometimes sites can be seen from the air even though they are invisible at ground-level. Aerial photography has become an invaluable tool for identifying and recording sites at risk of destruction, particularly in the fertile lowlands of eastern and southern Scotland. Deep ploughing and other agricultural activities (such as sub-soiling, drainage, deep ridging, and even putting up new fences) disturb the lower levels of soil and destroy buried traces of past human activities. Modern cultivation can also help to reveal the archaeology buried below the ploughsoil.

collapse and spread and will in time be buried by natural soil formation. All of these features will eventually become invisible on the ground surface especially after centuries of soil cultivation, but they can have an effect that can be seen from the air in a ploughed field (in the form of soilmarks) or in a field of crops (in the form of cropmarks). Visible contrasts are particularly marked during dry summers.

The most common prehistoric features to appear on aerial photographs in this way are those connected with houses, enclosures, burials and ritual.



This artist's drawing of a section through a field of growing crops shows the different effects of the ditch and wall buried beneath the ploughsoil. From the air, the ditch will show up as a darker band of taller and greener crops, and the wall as a paler band of shorter and weaker crops.

Once a site has been abandoned, any timbers usually rot away and the holes in which they were set fill up with decayed wood and soil. A ditch or pit will start to silt up as soon as it is dug, if it is not kept open. An old wall will

A timber house may be visible as a ring of post-holes or a ring-ditch, while an enclosure may consist of a narrow trench for a palisade or a ditch that was once accompanied by an earthen rampart.



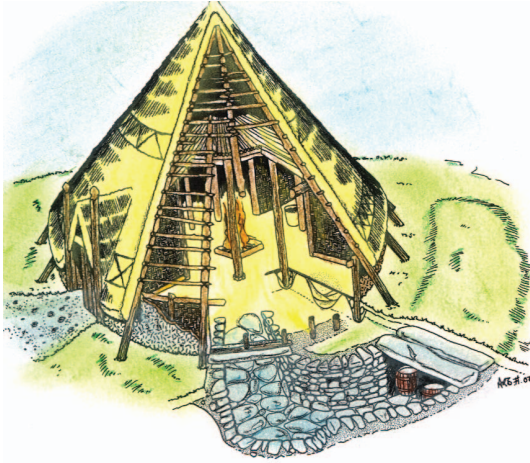
In the growing crop, circular and square outlines can be seen from the air. These are the ditches that once surrounded mounds of earth over prehistoric burials. (Fife) © Crown Copyright: RCAHMS. Licensor www.rcahms.gov.uk

A burial monument may appear as a small circular or square ditched enclosure with a central long pit for the burial itself. Ritual monuments take the form of cursus monuments (very long rectangular ditched enclosures) and henges (circular or oval ditched enclosures). Inside henges there may be pits that once held circles of timber posts. In eastern Scotland, souterrains often appear as dark banana-shapes. These underground storehouses are clues to the location of the above-ground houses that they served. Ancient field-systems and boundaries can be detected as linear patterns of dark lines or rows of pits (pit alignments). Many Roman forts, temporary camps, signal-towers and roads are known only as cropmarks on aerial photographs.



Here the pale patch is where the ploughsoil is thinnest, and it reveals the dark circles of three prehistoric roundhouses. Each has a drain running out through an entrance and traces of postholes and pits inside. The larger house in the foreground has a long fat blob adjacent to its south side: this is a souterrain or underground storehouse. (Perthshire)

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This artist's reconstruction gives an impression of a prehistoric roundhouse with an attached souterrain or underground storehouse. All that may survive of such a site now are the circular ditch and holes in which the house walls and posts stood, and the earth-filled base of the souterrain, although some artefacts and environmental remains may be preserved.

Systematic field-walking of ploughed fields can identify surface scatters of artefacts that also point to the buried archaeology. Worked flints and broken pottery are commonly found from all periods of the past, along with animal bones and, close to the coast, marine shells. Sometimes whole landscapes of buried multi-period structures can be seen from the air, which may span prehistoric, Roman, medieval and

later times. In Fife and the Lothians, cemeteries of Early Christian graves from the 6th to 9th centuries AD appear as regular clusters of long dark pits aligned east-west. Medieval homesteads surrounded by moats (water-filled ditches) and the formal gardens belonging to castles and stately homes are among the later monuments that have been identified by aerial photography.










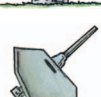



The underlying geology (subsoil and bedrock) also has an effect on what can be seen on aerial photographs. Sometimes it masks the archaeological evidence and other times it enhances it. Excavation of cropmark sites often reveals a complexity of archaeological remains that is not visible on aerial photographs. The richness of these sites is vulnerable to deep ploughing, as are many other sites that may not be visible from the air.

The aerial photograph of this site showed a crop mark of a large oval enclosure. The excavation, pictured here, revealed the details of the houses, pits and ditches of a multi-period prehistoric settlement. (East Lothian)

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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:

On a plateau above the steep slopes that border the river below are two prehistoric forts. Their ditches show up as dark arcs in the growing crop, but their ramparts have long since been ploughed flat. (Berwickshire).

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Historic Scotland is the agency within the Scottish Government responsible for administering the legislation that protects ancient monuments (buildings, ruins, archaeological sites and landscapes). It provides general advice on the presentation 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 looked after by Historic Scotland 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:

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Tel: 0131 668 8638

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