

KITE AERIAL PHOTOGRAPHY

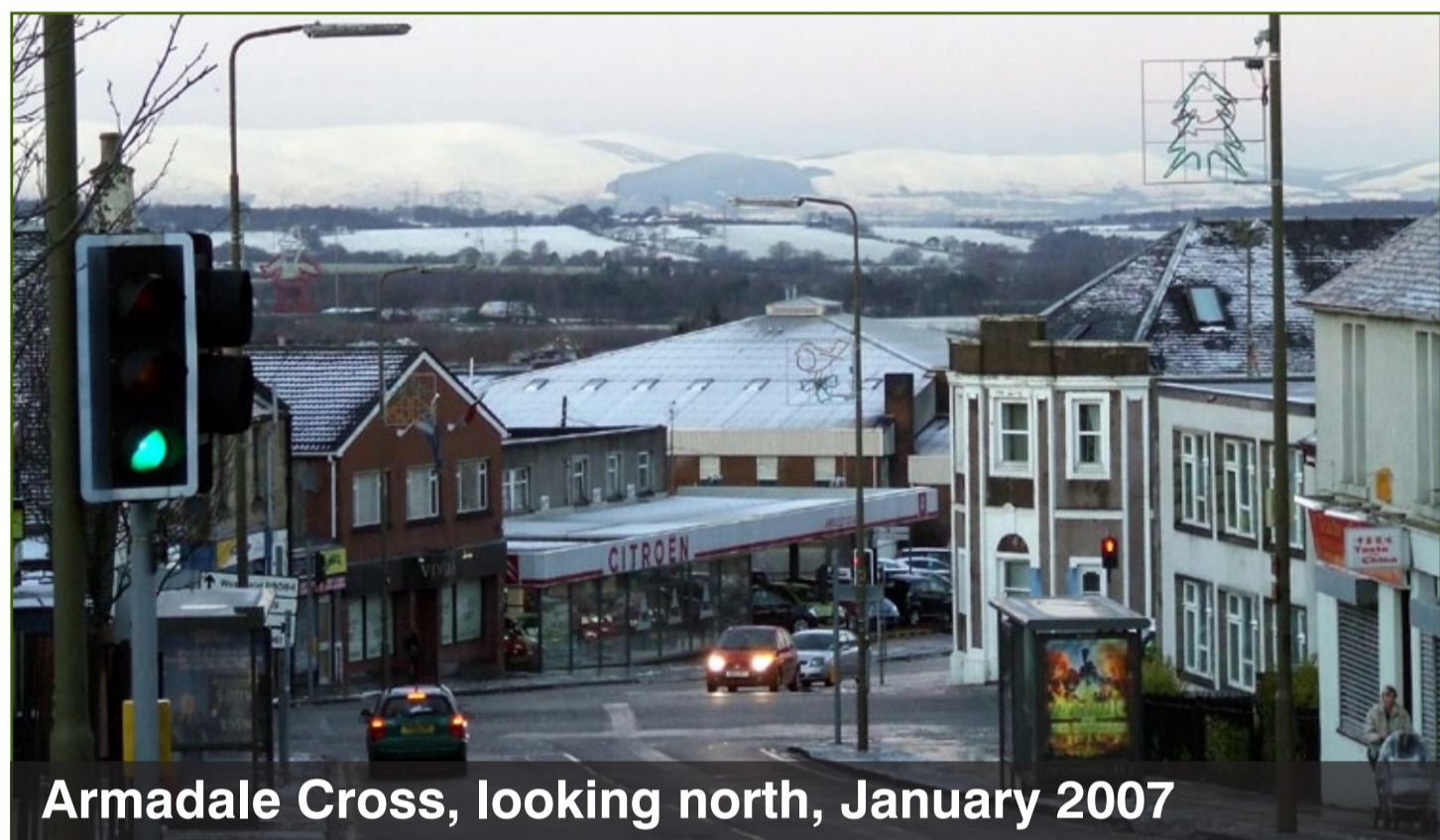
BY THE WEST LOTHIAN ARCHAEOLOGICAL TRUST

SIGNS OF CHANGE

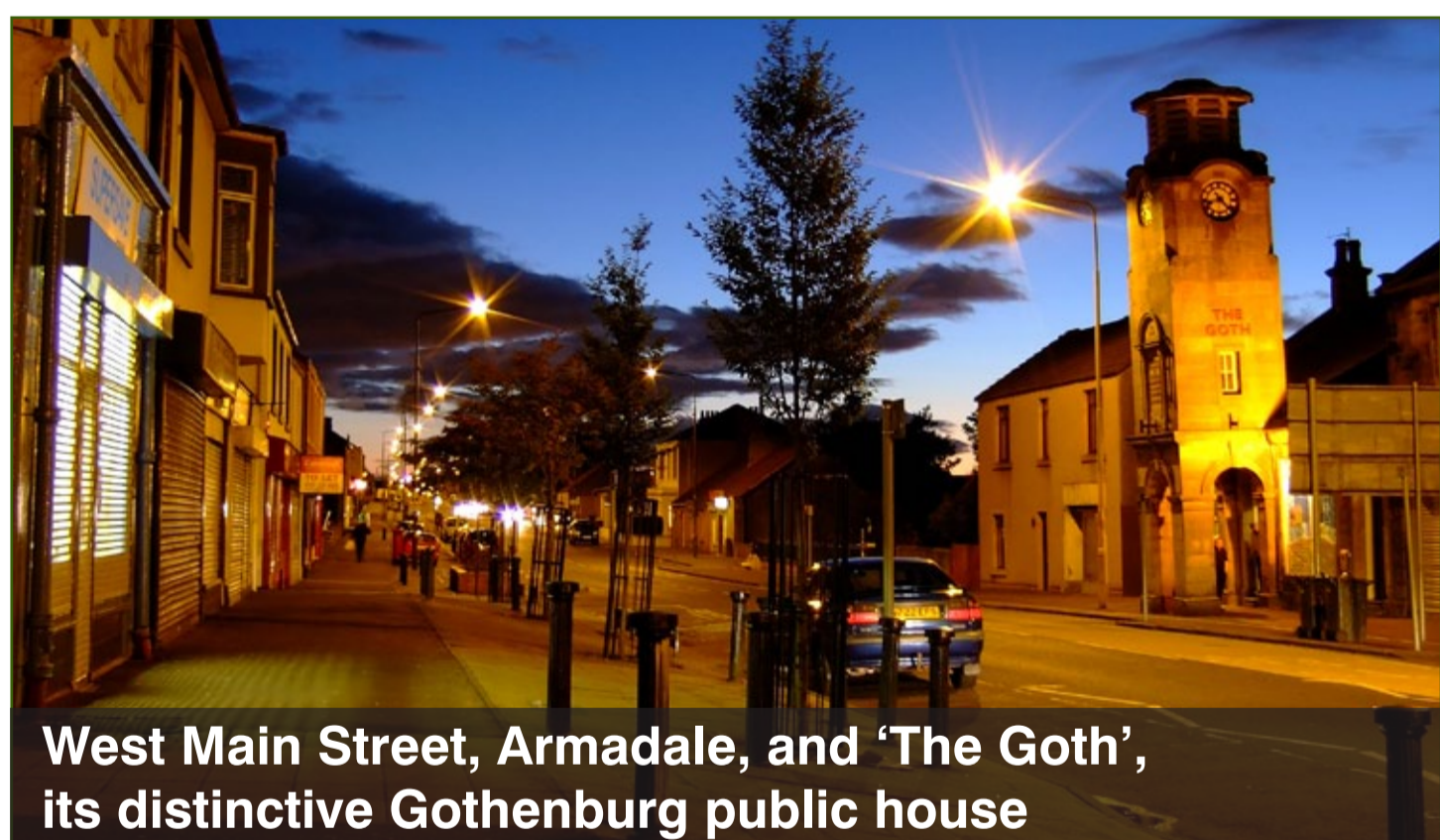
In June 2006, Armadale residents, Rosie and John Wells, created a community and heritage website for their town. It was decided that www.Armadale.org.uk should feature past and present photographs of the town and its surrounding area as well as of its inhabitants.



Inspired by local postcards and the History of Armadale Association's books of old photographs, the website's first photographs showed contemporary shopkeepers at work, local beauty spots, the remains of Armadale's industrial past and local places of historical significance.



Armadale Cross, looking north, January 2007



West Main Street, Armadale, and 'The Goth', its distinctive Gothenburg public house



North of Stonerigg Farm and Wood Park, Armadale



Armadale from the northwest

The website received a welcome response, particularly from many Armadalian ex-pats who wanted to see images of Armadale in the twenty-first century.

KAP

Over the last decade, there has been a growing public interest in aerial photography with aerial images freely available on the Internet.

Soon, it was realised that kite aerial photography (KAP) was the means of meeting the website's needs by capturing views of the town from a different perspective.

By taking up KAP, we were following in the footsteps of James Gentles, originally of Whitburn, who has provided an inspirational lead in the low-level aerial photography of West Lothian and has demonstrated excellence and technical innovation in the field of kite aerial photography.

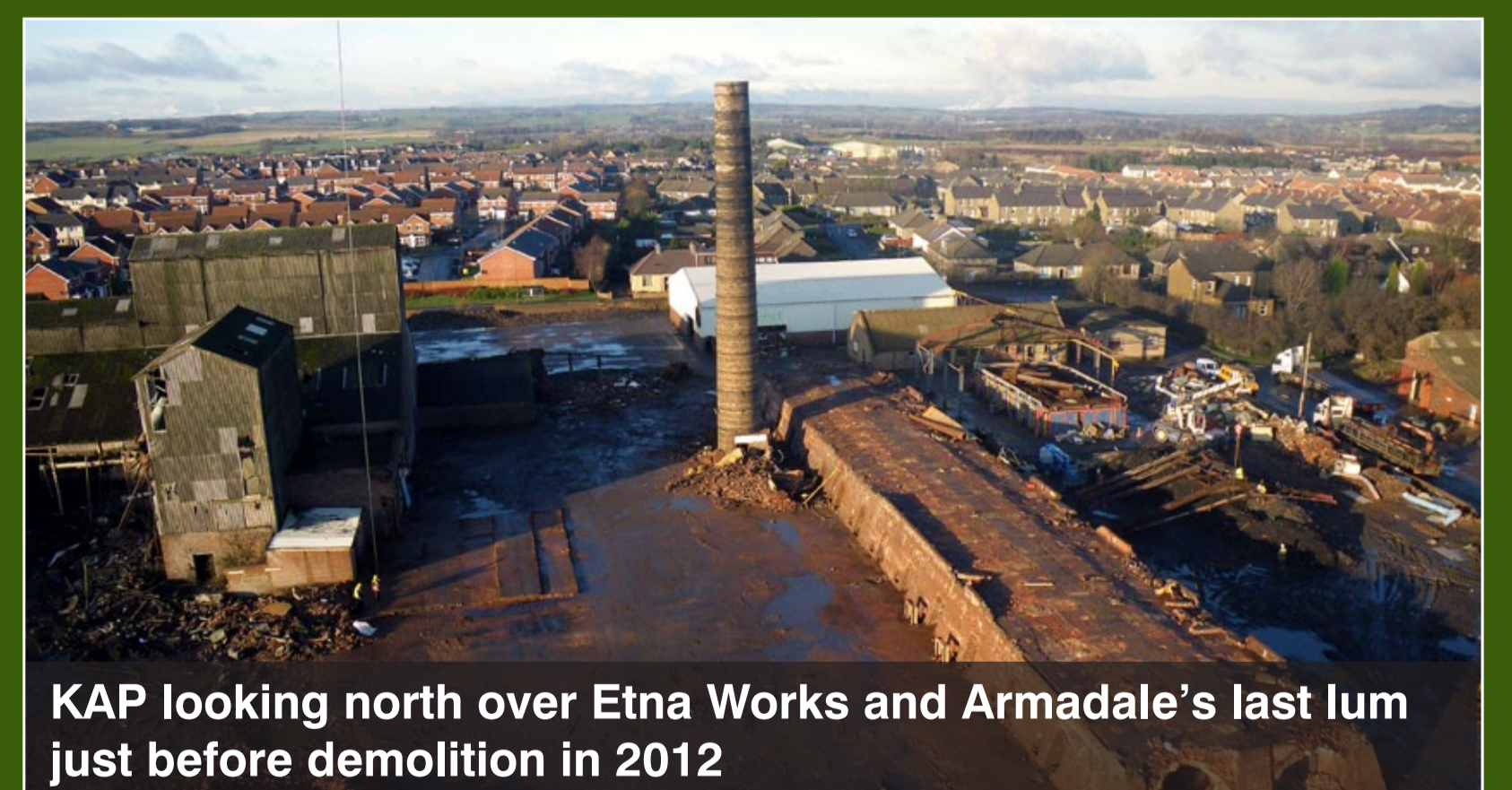
"Situated on the A89 west of Bathgate on the south ridge of the Barbauchlaw Glen, ... The population level of around 10,000 is fairly stable with development and upgrading taking place constantly. In 1851 the population was 141 increasing to 3191 in 1891 and over 4,000 in 1906.

Two world wars and the rapid industrial change have left their marks on Armadale... Coal is no longer King, steel foundering and smelting demand less and the community looks to new industries for help, but despite these changes the population has remained steady and continued to grow."

R.D. Dingwall, Vice-chairman, Armadale CC, Armadale Town Guide 1989.



KAP of Armadale Academy (left, before its opening in 2009) and the former Armadale Academy (right, opened officially 1968) before its demolition



KAP looking north over Etna Works and Armadale's last lum just before demolition in 2012



KAP looking north-west over Watson Park and Armadale Gala Day entertainments

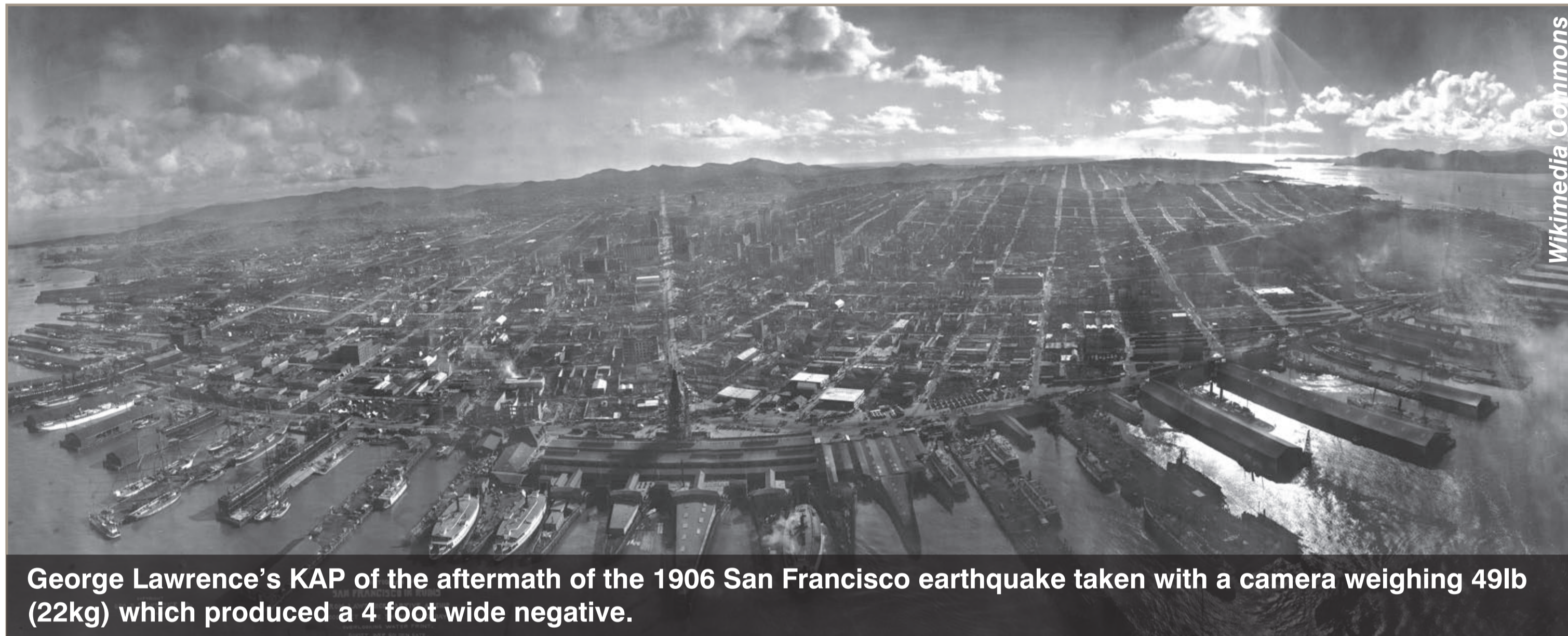
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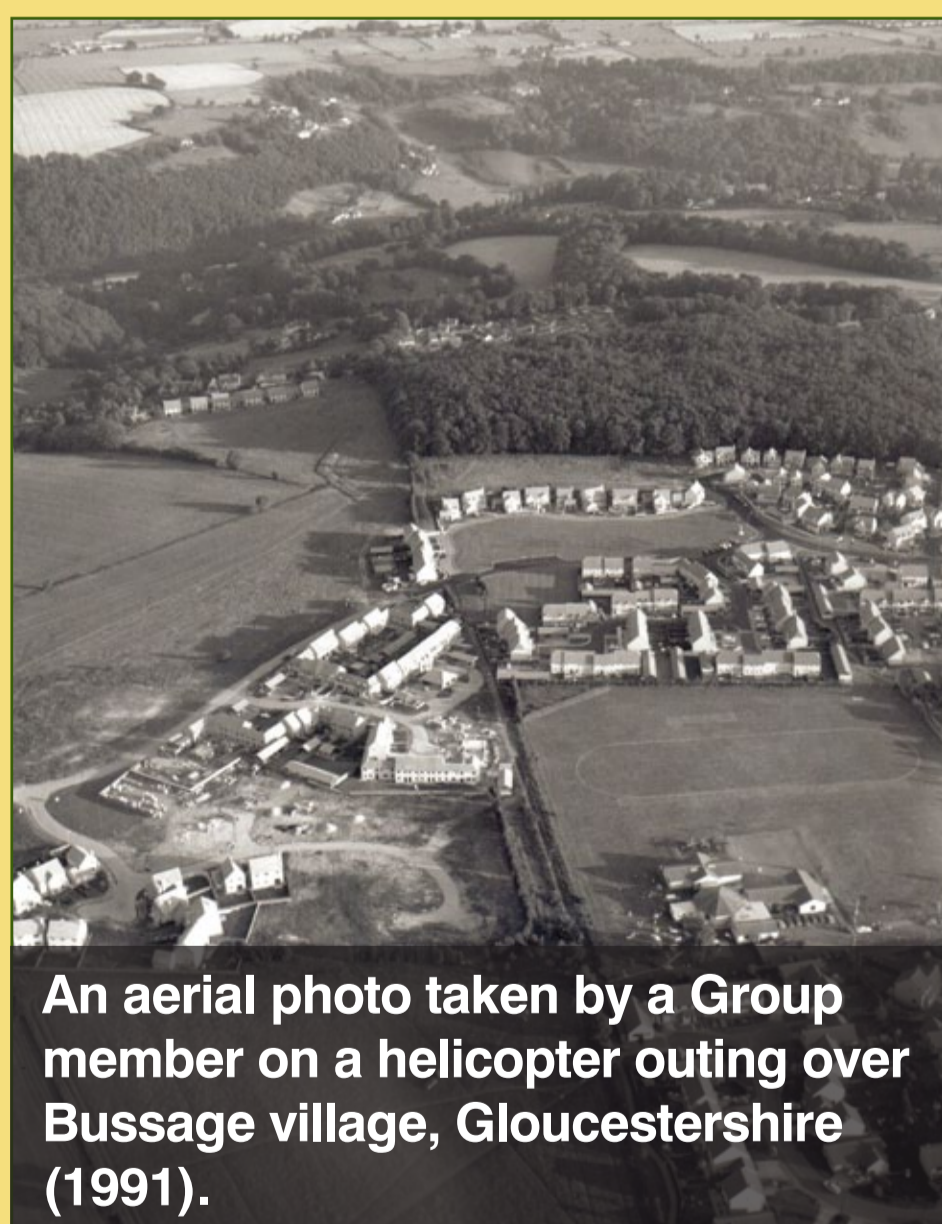
AN INTRODUCTION TO KAP

Arthur Batut, French photographer and pioneer of aerial photography, published his first book of kite aerial photography, **La photographie aérienne par cerf-volant**, in 1890. The book contained a kite aerial photograph of Labruguière, France, taken in 1889.

Nowadays, aerial photographs are usually taken from satellites, aeroplanes, helicopters, unmanned aerial vehicles (UAV) and balloons.



ARCHAEOLOGICAL PHOTOGRAPHY



All of the UK has already been photographed from the air. However, the limitation of using archived images for archaeological photography is that they are taken at a given point in time, which may not be the most appropriate for any given site. For example, you may want to bring out surface features by taking shots when the sun is bright and low in the sky, casting strong shadows. Features on some archaeological sites may be highly dependent on the direction and angle of view, thus requiring numerous photos to be taken. On some sites, you may want to take photos when the soil is particularly dry, so that sub-surface features can be delineated by changes in the colour of vegetation or when there has been a fall of snow.

Ideally, to maximise information from a site, comprehensive, high resolution aerial photography (usually from less than 60 metres and often much lower), in at least the visible part of the spectrum, should also be undertaken before planning any excavations. Such techniques can no longer be excluded on the basis of cost or difficulty and should be available to all archaeologists in the field. Near infra-red photography should be considered a routine procedure regardless of platform. On some sites, details, which are only visible in the near infra-red, would start to be lost once excavation began and it is clear that the failure to record such information would be bad practice. Another technique is thermal imaging, which is slowly becoming more affordable.

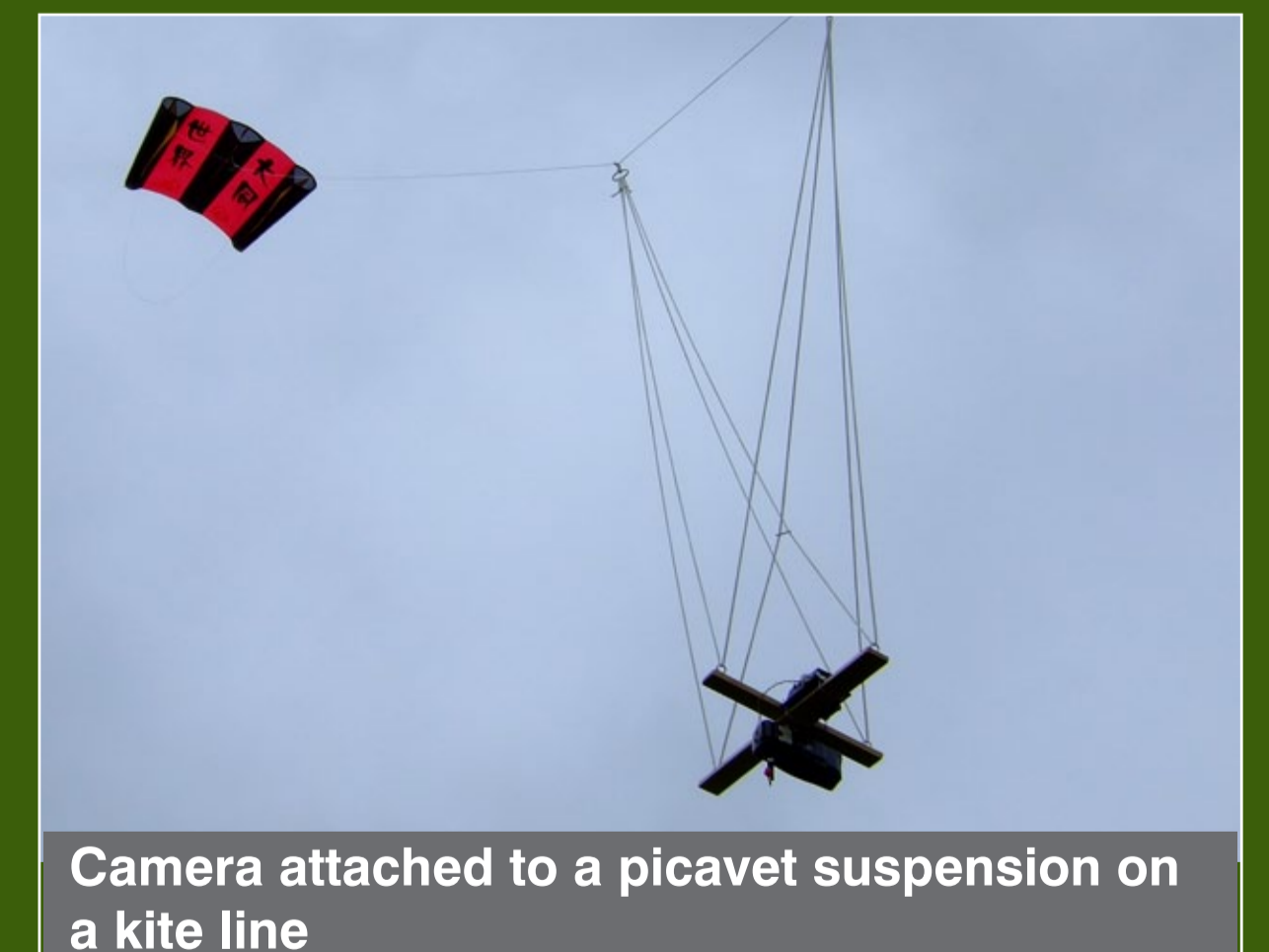
WHY CHOOSE A KITE AS AN AERIAL PLATFORM?

Kites have specific advantages for aerial photography:

- Low initial cost
- No running cost
- Low skill requirements
- Portability
- High resolution
- Ready to use when needed
- Single person operation (but two better!)
- Inclusivity
- Zero environmental impact (no fuel / noise)
- Upgradeable to remote control and video preview, if necessary
- Can lift a heavy load.



Pole aerial photography (PAP) is also possible as it is not dependent on the weather conditions, but height is limited. Simple, portable poles should be part of the personal photographic kit of any field archaeologist.



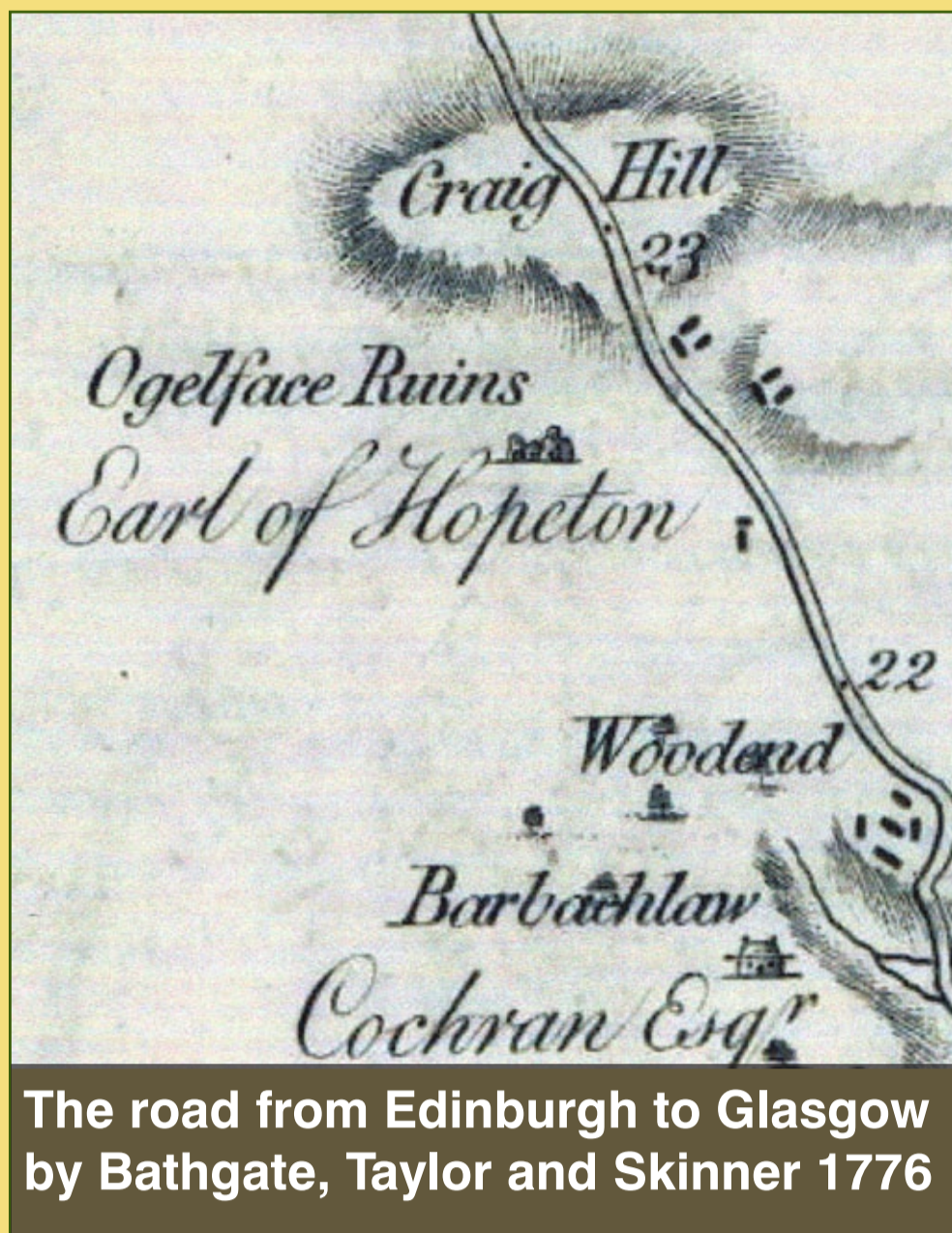
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OUR FIRST USE OF KAP ON ARCHAEOLOGICAL SITES

Ogilface Castle was often mentioned when local people talked to us about sites of historical interest, particularly in relation to the Barony of Ogilface. There was some disagreement about the location of Ogilface Castle, whether the old castle site at Woodend, which was renamed Ogilface Castle in the Ordnance Survey Name Book (1856), or the site in the hills above Blackridge, where it was described as 'Ogelface Ruins' on the Taylor and Skinner road map of 1776.

It was decided to investigate both possible sites with the help of the Edinburgh Archaeological Field Society who conducted the initial survey in April 2007.



The road from Edinburgh to Glasgow by Bathgate, Taylor and Skinner 1776

“Ogilface Castle (Remains of): a small oblong building, walls 3’ high, but the inside filled with ruins. There is nothing definitely known about it, but the tradition is that the Covenanters made it a place of defence and protection; it is also stated that there is a large excavation in the ridge under the ruins. It was the seat of the ancient family of de Bosco, barons of Ogilface, passing into the possession of the Earls of Linlithgow, and upon the fall of that family, ceased to exist as a barony and was sold in portions to different proprietors. It appears to have been a place of some strength, though of no great size.”

New Statistical Account (NSA) 1845; Ordnance Survey Name Book (ONB) 1856; F Groome 1902

“Familiarly called the ‘Old Castle’ & sometimes ‘Woodend Castle’...”

Name Book no 21, parish of Torphichen

OGILFACE, WOODEND



Near infra-red photograph taken of the Ogilface Castle site from a footpath to the south.



Ogilface, Woodend, covered in snow.



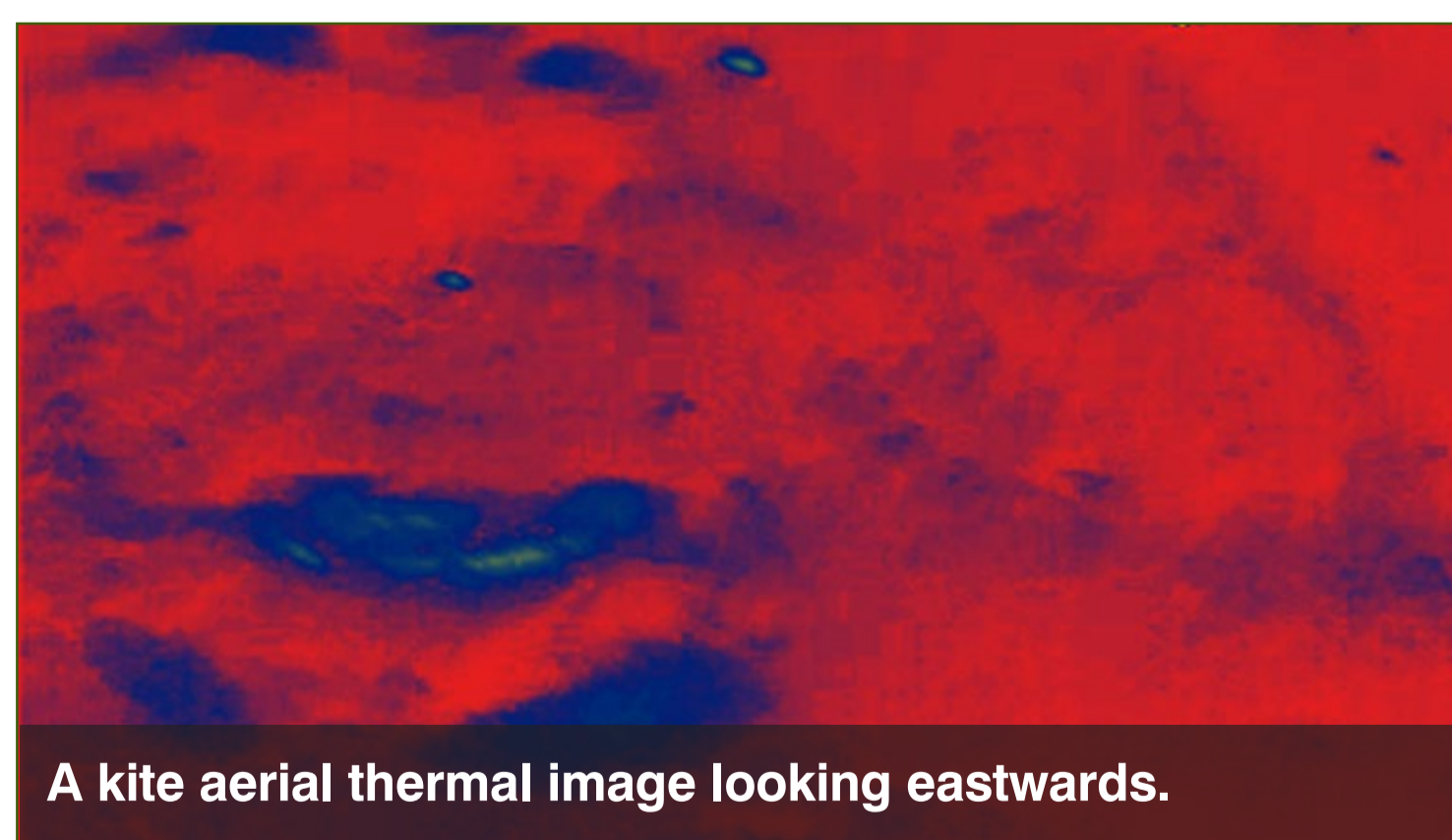
Near infra-red kite aerial photograph of the Ogilface site and Woodend farm.



A good KAP example of taking a photograph with the sun low in the sky bringing out the shadow relief in the ruins of Ogilface Castle.



A kite aerial photo in the near infra-red looking eastwards.

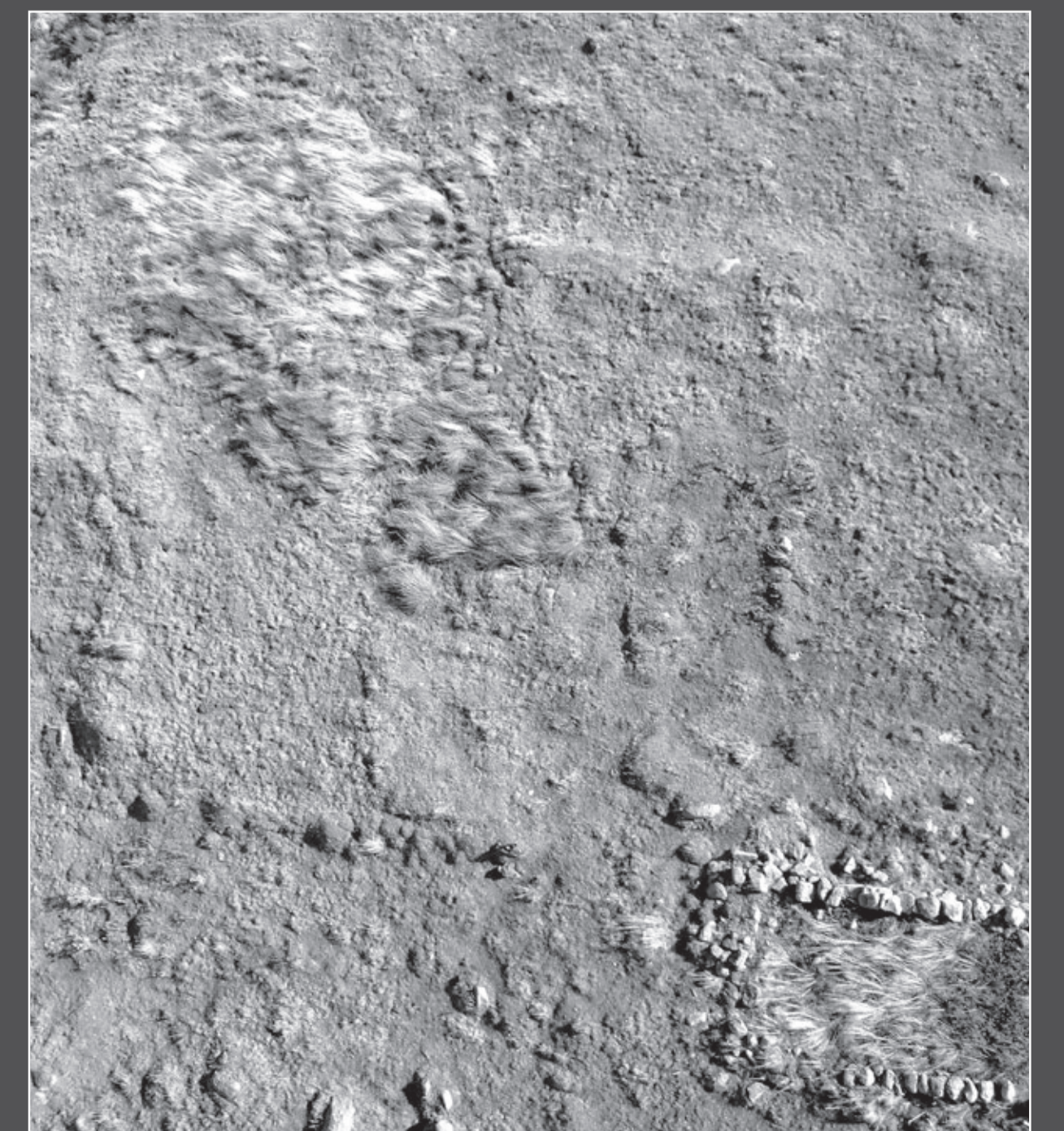


A kite aerial thermal image looking eastwards.

OGILFACE NEAR BLACKRIDGE



A near infra-red photo of the site (centre) 'Ogelface in Ruins' near Blackridge.



Vertical kite aerial photo of part of 'Ogelface Ruins' site with a 'cattle shelter' lower right.

BEGINNINGS

2007: Our first aerial photos of the Woodend site. We became known, informally, as West Lothian Aerial Archaeology.

2008: Jim Knowles, an archaeologist, visited the Ogilface site during a follow-up survey by the EAFS.

2010: With Jim Knowles, we became known as the West Lothian Archaeology Group.

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WEST LOTHIAN'S ARCHAEOLOGICAL SITES FROM ABOVE

As the Group developed its skills, it ventured into many corners of West Lothian to look at interesting sites, some easier to access than others!

Torphichen Preceptory, the former administrative headquarters, in Scotland, of the Knights Hospitaller of the Order of St John of Jerusalem, is situated below the Torphichen Hills, in the village of Torphichen, West Lothian.



Torphichen Preceptory; Castlethorn hillfort to the left; telecom mast at Cairnpapple visible on the horizon.



KAP of Castlethorn hillfort



KAP of snow-covered Gormyre Hill, to the north of Castlethorn

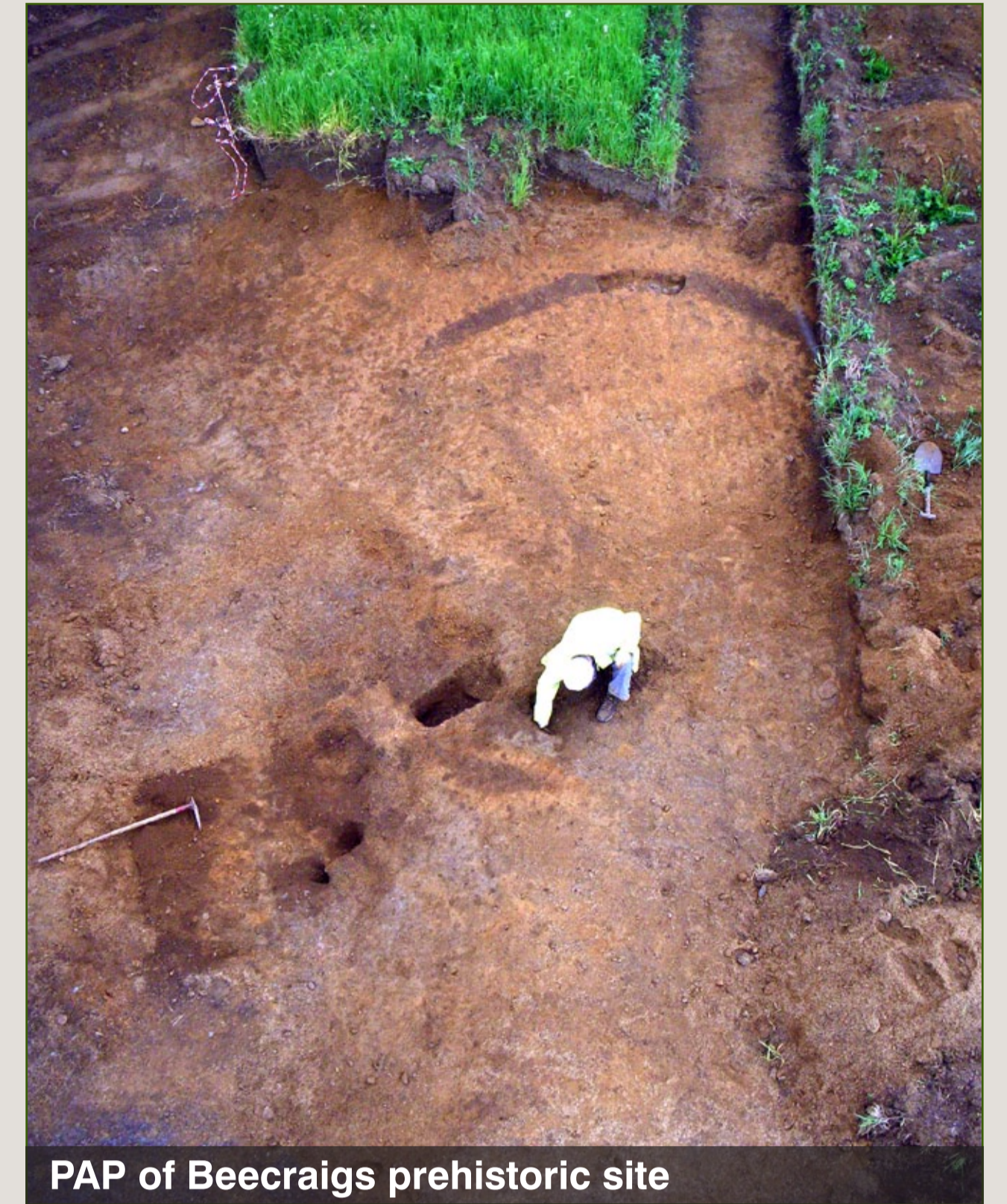
Despite recent extensive aerial photography and geophysical surveys, the nature of this site is undetermined until excavation reveals its true nature.

“The most important mainland archaeological site in Scotland, Cairnpapple was a centre of worship and burial for over 3000 years. First the burial ground, then a henge of 24 large stones, and then an enormous cairn; in all five phases of ritual burial and cremations, with concentric rings of pits, ditching and banking. Excavated 1947.”

West Lothian: An Illustrated Architectural Guide, by Stuart Eydmann, Richard Jaques and Charles McKean, 2008.



KAP of Cairnpapple covered in snow



PAP of Beecraigs prehistoric site

“Headland Archaeology (UK) Ltd undertook a series of archaeological investigations in advance of construction of a new eco visitor centre at Beecraigs Country Park, West Lothian. The work revealed evidence of prehistoric activity, in the form of a timber circle, a ring ditch and a roundhouse. The timber circle was located on top of the small hill on which the site is situated and comprised of seven postholes forming a circle. The ring ditch lay immediately to the west of this timber circle. Slightly off the crest of the hill on a slight natural terrace the heavily truncated remains of a roundhouse with an exterior annexe were discovered.”

Beecraigs Country Park, West Lothian Archaeological Evaluation for West Lothian Council, by Jamie Humble



KAP of defensive banks at Cockleroy hillfort



Composite KAP looking down on Bowden hillfort



Linlithgow Palace: KAP in the near infra-red, looking west



Linlithgow Palace: KAP, in the near infra-red, looking east



KAP of Castle Greg Roman fortlet

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OUT AND ABOUT I

DAER VALLEY, CLYDESDALE



Tam Ward describing the Daer Valley site in November, 2011



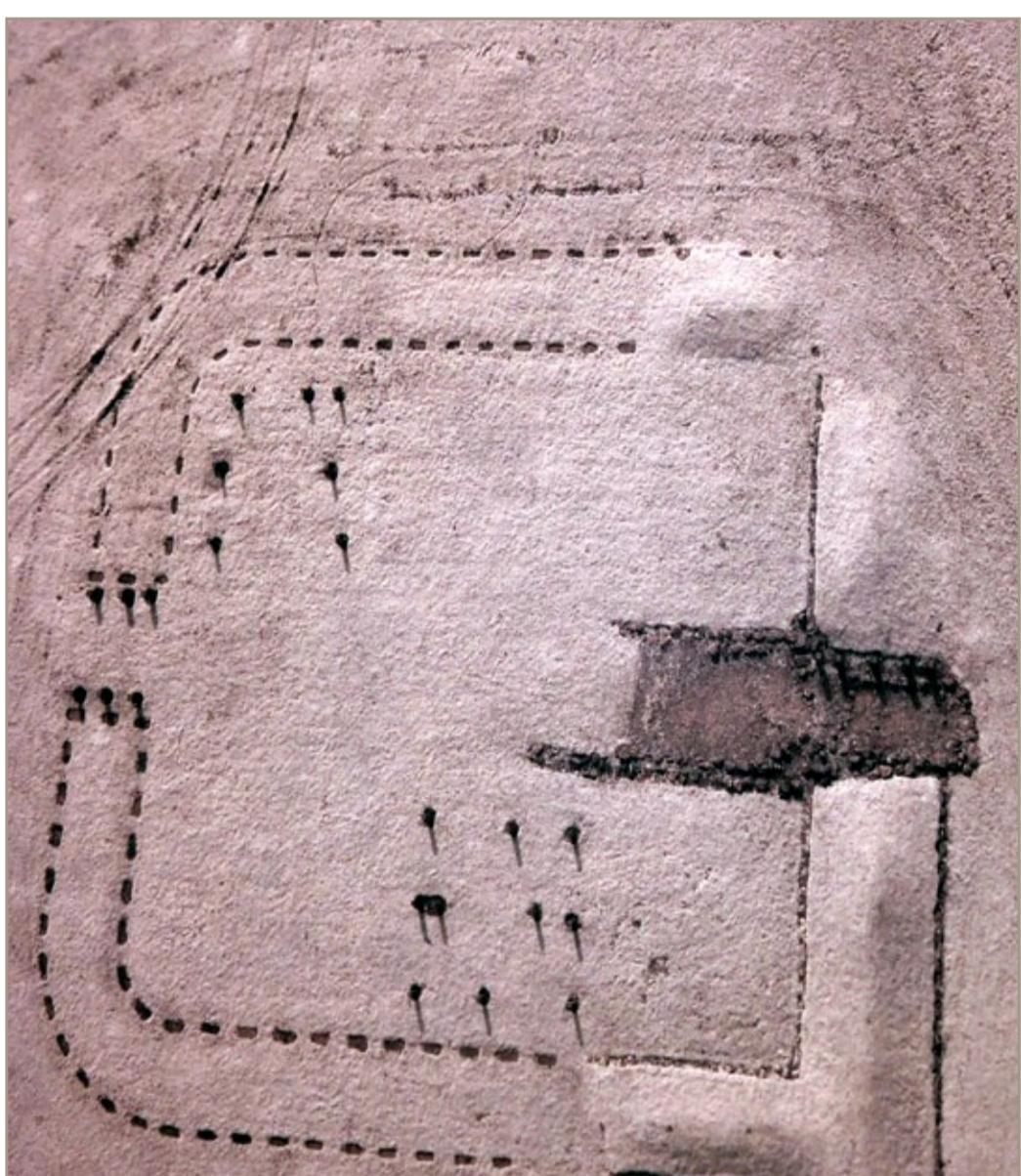
KAP of Daer Valley site

"We have been working flat out for over a year to salvage as much as possible from the Coom Rig site in Daer valley ... where the forestry ploughing revealed an incredible and hitherto unknown archaeological landscape and one which has no parallels in the history of our work... The current site: No 111 ... being worked on stone appears to have been kerbed and, at the time of writing, a gully has been found with a layer of stone within it and which appears to transect the area."

From Biggar Archaeology's Clydesdale Project: First results from Daer 2010-2011, September 2011 by Tam Ward

'OLD HALL', NETHERTON, NORTH LANARKSHIRE

An ornate skewput found being used as a gatepost in a dairy wall of Southrigg Farm west of Armadale prompted a search for its original site. The Old Hall at Netherton was identified as the nearest possible source. Allan Mackenzie at Airdrie Library pointed out the association of the Hall with Dowager Lady Torphichen from the survey by William Forrest (1816).



Infra-red KAP of Kinneil Roman Fortlet site. The location of Geoff Bailey's two parallel 1980-81 trenches can be seen on the right

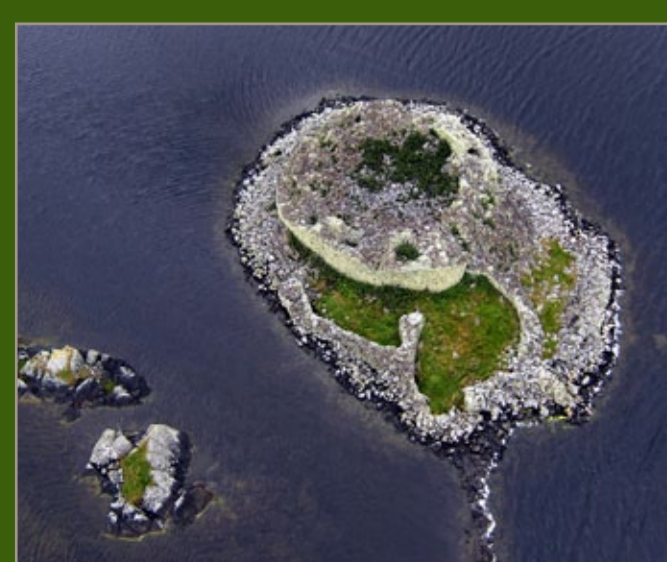
KINNEIL, BO'NESS, FALKIRK

"We joined Geoff Bailey and local volunteers for a total of four days excavation at Kinneil over the last two months. On 11 and 12 April, in anticipation of drainage works which will disturb the location, we set out to see if we could trace the spur road linking the fortlet with the Military Way. Three trenches were dug, and in one, evidence of a gravel surface which could be the spur road was found. The excavations also helped to develop a clearer picture of how the site must have looked in Roman times, as its contours have since been substantially altered by ploughing and 17/18th century estate landscaping."

Report by EAFS member John Urquhart, Edinburgh
Archaeological Field Society News, Issue 183, May 2011



Near infra-red KAP of Grimsay Wheelhouse, Bagh nam Feadag



Dun Torcuill Broch, Uist

OUTER HEBRIDES

This is an Iron Age wheelhouse located on the northern side of the loch. The wheelhouse was excavated in the 1990s and a trace of an earlier building was found below with later buildings built around it.

BLACKNESS CASTLE, FALKIRK

"Blackness Castle stands on a rocky promontory on the shore of the Forth, in the East part of Carriden Parish, Linlithgowshire... Blackness was in its time the Port of Linlithgow, and the Castle was one of the four fortresses agreed by the Act of Union to be kept up in Scotland as a chain of forts for the defence of the Lowlanders against Highland aggression. In 1807 - 74 it was made the base for extensive works to serve as the central ammunition depot of Scotland..." Canmore



For the first time, the Group flew a camera over water from the end of the Castle's jetty. As a result, the ship-like appearance of the castle could be appreciated more effectively

ARDOCH, PERTH AND KINROSS

"The Roman fort at Ardoch is one of the best preserved in the Roman Empire. The remains comprise a rectangular area of around two hectares, surrounded by a rampart and up to five ditches in places. It was occupied by the Roman army on several occasions, and is located by the Roman road which ran north from the Forth-Clyde isthmus. Aerial photographs have revealed cropmarks in the vicinity of the fort, representing up to six temporary marching camps and another probable fort." Canmore



Composite KAP of Ardoch Roman Fort

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OUT AND ABOUT 2

NIDDRIE ESTATE, EDINBURGH

This strange grey structure at the back of the Niddrie estate in Edinburgh did not impress until viewed from above. The statue of Gulliver was designed by Jimmy Boyle in 1976, and built by unemployed people. Part of the left foot will be left in place as a memorial within the landscaping of the new burn.

The excavation area contains an unknown seventeenthth to eighteenthth century farm. This would have been part of the estate. There are just fragments that remain, including cobbled surfaces with drains, an odd rectangular structure (tank), a well/mine shaft, a hearth, various wall fragments, post holes and an ice house.



KAP taken during Niddrie Burn Public Archaeology Day



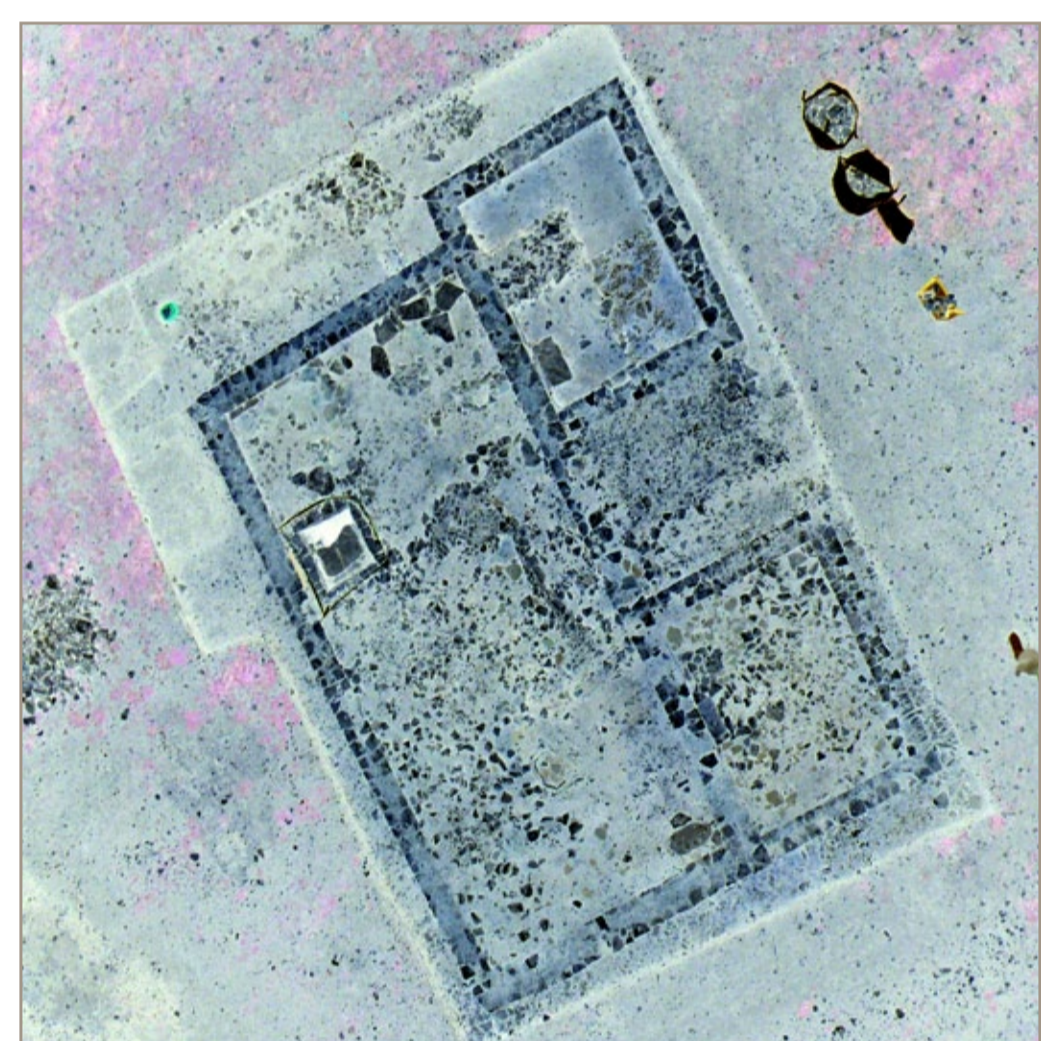
KAP of a site excavated by AOC Archaeology on the Niddrie Marischal Estate. The main estate house would have been to the west and was removed in the eighteenth century

ISLE OF BUTE, ARGYLL AND BUTE

“This cairn is situated in an arable field 270m S of Scalpsie farmsteading. It has been very heavily robbed and it is not now possible to distinguish its perimeter within an irregularly-shaped stony area measuring about 46m from NE to SW by 32m transversely. On the NW side of this area, amongst stones and boulders that have been cleared off the surrounding field, is a vertically set slab which may be part of a cist, possibly the one described around 1863 (OS Name Book, Buteshire No.7, p.92). A large hollow, measuring about 8m across, which has been cut into in the SW edge of the cairn may represent the remains of a building.” Canmore



KAP of Scalpsie Cairn (remains of), East of Dun Scalpsie



Inverted (ie negative) of the image right



GLOUCESTERSHIRE

KAP photograph taken by Group members on an evening visit to Tony Robert's Archeoscan site near the main Roman road, known as Antonine Iter XIV, running north-south between Gloucester and Bath. An extensive stone building containing Roman domestic debris was being excavated on this fascinating farm site.

BOLTON ABBEY ESTATE, NORTH YORKSHIRE

The Black Canons of the Order of St Augustine founded the Abbey (technically a Priory) in 1154 on land overlooking the River Wharfe, donated by Lady Alice de Rumilly owner of Skipton Castle.



KAP of Bolton Abbey

CAERWENT, GWENT, WALES



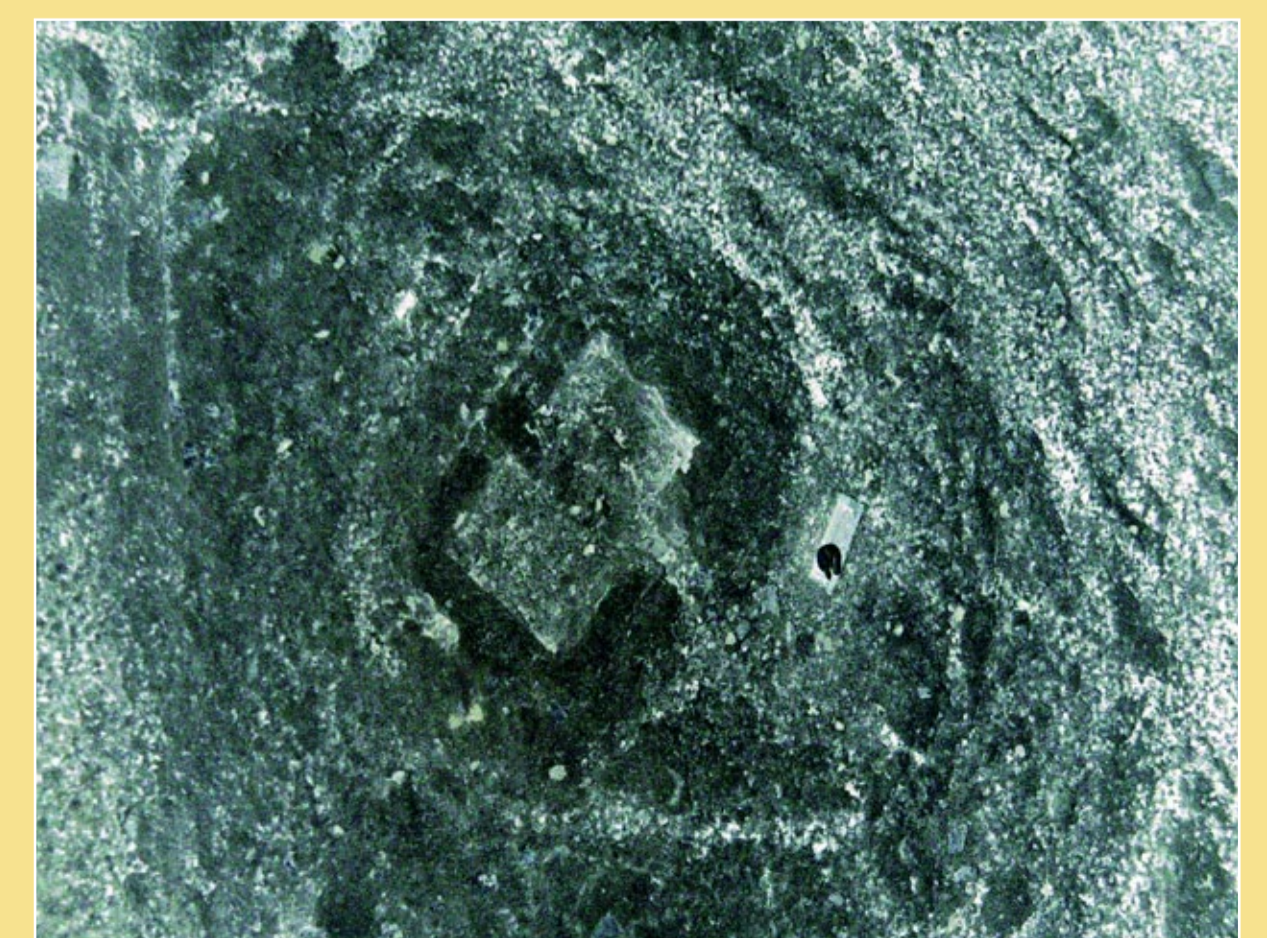
Infra-red KAP of the south wall of the Roman town Venta Silurum (Caerwent), Gwent, Wales.

ADDINGHAM, YORKSHIRE



Round Dykes Camp (centre right) on Addingham Low Moor, Yorkshire

“St Ninian's Chapel is situated on a narrow peninsula. The chapel oriented E-W measures 6.3m by 4.0m internally and the walls are 1.2m wide and 0.9m high with an off centre entrance in the S side. It is enclosed by the remains of a near circular stone wall 24.0m E-W by 23.5m transversely overall.” Canmore



KAP of St. Ninian's Chapel. Near infra-red inverted (negative) image

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THE FUTURE

“Archaeology is no longer just about digging holes. New research, undertaken by a team led by the University of Leeds, should revolutionise the effective use of ‘state-of-the-art’ remote sensing technology such that aerial detection of archaeological sites will increase dramatically without physically disturbing cultural heritage sites.” DART project press release, September 2011. These sentiments reflect the aims and objectives of the West Lothian Archaeology Group.



On 19 April 2012, Sybil Cavanagh oversaw Jim Knowles, Rosie and John Wells at the West Lothian Local History Library signing the document that set up the West Lothian Archaeological Trust.

The West Lothian Archaeological Trust was formed on 19 April 2012 and registered as Scottish Charity No. SC043118 on 26 April 2012.

The Trust was established to support the activities of the West Lothian Archaeology Group, which was formed in 2010, having been known informally, since 2007, as West Lothian Aerial Archaeology.

AIMS

The aims of the Trust are for ‘the advancement of the arts, heritage, culture or science’ by:

- Investigating (with emphasis on non-invasive techniques), recording and publicising (by publication and presentation) the archaeological/heritage sites of West Lothian, and elsewhere.
- Promoting the use of kite aerial photography as a low-cost, inclusive, environmentally friendly technique for archaeological/heritage photography and promoting the use of any other techniques which may be deemed appropriate by the Trustees.
- Running and maintaining an archaeological website (www.WestLothianArchaeology.org.uk) as part of an associated community and heritage website (www.Armadale.org.uk).

TRIED AND TESTED TECHNIQUES



Group and Trust Archaeologist Jim Knowles using the Group’s soil resistance meter

There are many tried and tested techniques of non-invasive investigation used by archaeologists. The ones most commonly employed measure soil resistance or magnetic field strength to identify and map features below the surface of the soil. Ground penetrating radar is also used.



Dr Peter Morris with his gradiometer (magnetometer) on Gormyre Hill as part of the Edinburgh Archaeological Field Society 2010 survey

Poles have been used for a long time to capture low-level aerial views. The West Lothian Archaeology Group specialises in KAP in the visible and near/thermal infra-red parts of the spectrum. The near infra-red can reveal features that are normally invisible or difficult to see, as shown for Rufford Abbey in Nottinghamshire.

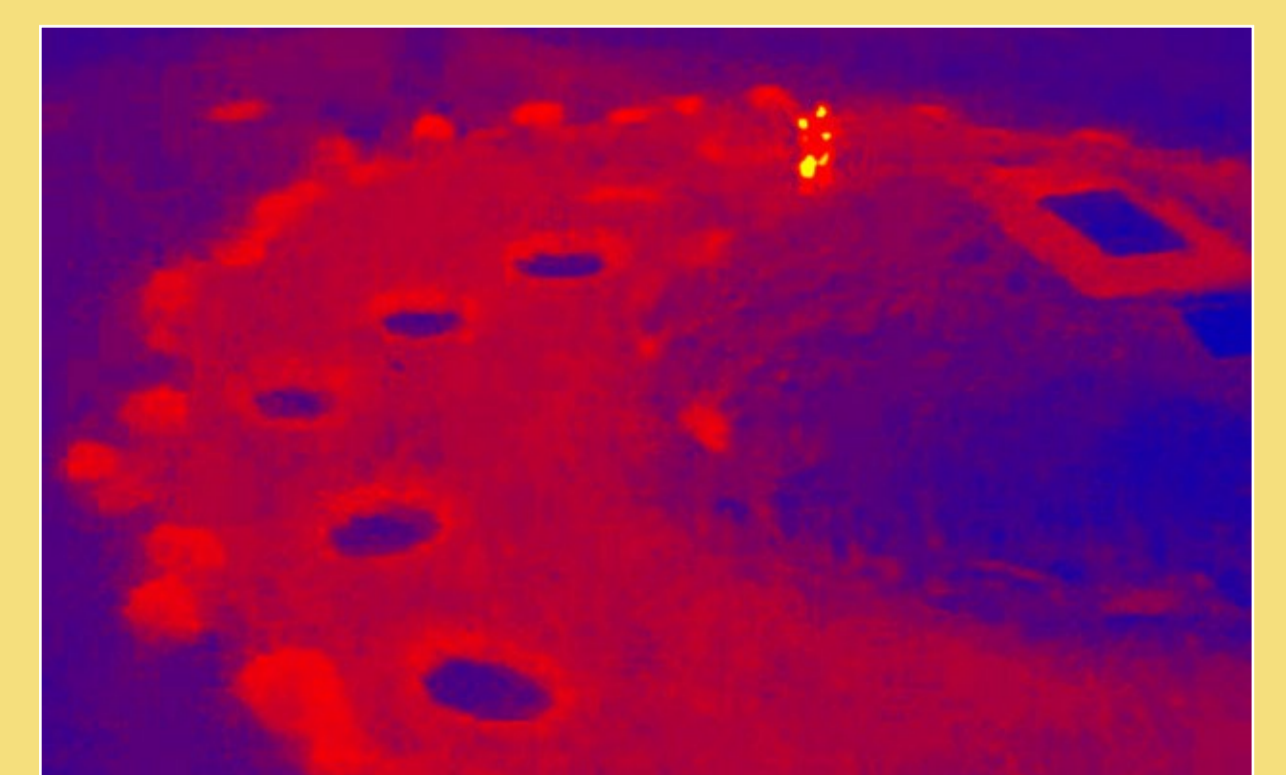


Near infra-red KAP of the end of Rufford Abbey revealing wall foundations corresponding to the less well defined parch marks.



KAP of Rufford Abbey: Note that at the end of the building the grass is beginning to go brown (parch).

The West Lothian Archaeology Group has pioneered the use of kites for capturing images produced by only the heat emitted from an archaeological site. Thermal images can reveal surface and sub-surface features by visualising their differential cooling and warming, or by showing temperature differences resulting from differential water loss in overlying crops. This technique, along with near infra-red kite and unmanned aerial vehicle (UAV) aerial photography, hold much promise for the future of archaeological investigation.



Thermal infra-red kite aerial photo of Cairnpapple

Non-invasive archaeological investigation in West Lothian is particularly difficult because of the climate and ground conditions. In meeting these challenges, the Group hopes that its approach will make a significant contribution locally and provide a methodology that will find wider application elsewhere.

More details and contact information can be found on the Armadale Community and Heritage website

www.Armadale.org.uk