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Chris Musson, principal organiser (top) with aerial maestro Otto Braasch (left) and “Our man in Siena”, Stefano Campana (right).
Editorial

Italy
AARG, English Heritage and the University of Siena ran a very successful one-week ‘research school’ at Rosia near Siena in May 2001. Elsewhere in this issue are the official statistics, comments by one the students, and a few photographs. Here I would like to add a few of my own thoughts as one of the tutors. Greatest thanks have to go to Stefano Campana, our man in Siena, for making the course possible and especially for meaning it when he told us ‘no problem’ during our February reconnaissance or by email. The biggest ‘no problem’ was that the University really did buy us the requested and necessary six PCs that allowed Ground School to progress from looking at air photos to taking the mapped interpretations into GIS.

Our previous ‘training weeks’ have been friendly and relaxed with no barriers between teachers and students and Siena continued that tradition. I think it was helped because, for the first time, all students were of one nationality and were able to talk in a common language that the teachers could not understand! The Ground School teachers soon learned that the Italian way of doing anything included a lot of talking about it (‘jabber’, we were told, was a banned word) but it seemed to do no harm and all students completed the full range of tasks we set them. We were pleased to find that our Italians were keen and hard-working. Some even insisted on working late and so kept me from my beer. We have since heard that two of them have made further photographic flights and there are others who hope to specialise in aerial work at the end of their university courses. Email contact helps keep such interest alive and is an important post-meeting aspect of these international occasions.

What I saw of the aerial photographs suggests that, as usual, we have left the local archaeologists with a lot of follow-up work. Flights covered a considerable area and recorded features from pits, Etruscan tombs, Roman villas (of course), to stone-walled upland field systems that would not look out of place in Yorkshire. We believe that Klaus Leidorf also flew his 400mm lens over the beaches at Elba – but we weren’t shown those photos… Cathy Stoertz and I managed to get one flight with Otto Braasch but there are no Italian air photographs in this issue. Some of the sites I photographed could have been included, but there seems no point in publishing a picture of an unknown site just because it is an aerial photograph.

The school was followed by a three-day workshop in Siena which was disappointingly free of Italians but at which the attendees had a useful and informative time in a resonant room. Workshop topics were mostly concerned with ongoing work, some in its early stages, and included presentations on current mapping methods, digital imagery and LIDAR, and uses of satellite data. Italian contributions dealt with interpretation of vertical photographs, uses of satellite images, and recent work in Puglia and the Tavoliere.

Printing of photographs
I was very pleasantly surprised to find some excellently printed 1999 obliques among batches of NMRAP prints I recently was using. They were from flights made by EH’s York and Swindon teams and so this seems to be a common change for the good. Photographs had been printed with good contrast at the usual 9 x 9 inch format on semi-matt paper. Bob
Bewley suggested that the change in print quality may be the in-house photographers’ response to years of nagging. If so, it has been worth doing. Mmmm, I wonder if they’ll do reprints to the same standard from the last 15-odd years….

This issue
I am pleased to include the ‘thinking’ part of Davy Strachan’s Stour Valley Project in this issue. We need time to add ideas to the maps made from aerial photographs and this is best done by the photo interpreter. There are some interesting points made in Davy’s contribution which others may see reflected in their own current research areas. I especially like the use of burial and ritual sites to ‘cut off’ river loops and suggest this also indicates the deliberate choice of meadow land for burial grounds in this area. Any mound will give an increase in surface area to the field and may encourage colonisation by different types of vegetation which may (or may not!) provide a better diet for grazing livestock.

We also have two contributions from ground-based aerial photographers. That by Richard Knisely-Marpole meets to the need to document sites in a country where conventional flying would be ‘difficult’, and the longer contribution by Michael Schonherr shows how a model aircraft was used to provide an answer to a particular question. The thinking behind this detection work is a good demonstration of the progression from question, through research, to aerial survey of an area, and so to identification on the photographs of an answer. If only we all had time to study each site with equal thoroughness!

There is a scatter, through this issue, of photographs taken on and around the Siena research week. These roughly illustrate the written pieces about the course and show that a good time was had by all. The photos were taken by Pete Horne and your Editor.

Thought for the day? (contributed by another Anon)
Looking at the Vale of York leaflet in AARGnews 22, I see EH’s new tag line is No one does more for England’s Heritage. That’s not much of a boast considering they’re called ‘English Heritage’, and should be doing as much as possible….

International drinking habits: spot the difference…
Chairman’s Piece

D. Strachan

The last six months has seen two important events for aerial archaeology in Europe: the British Academy two-day symposium entitled “Aerial Archaeology – into the future”, held in London in May (see http://britac3.britac.ac.uk/events/programmes/010511aerial.html), and the Siena research school and workshop. Further information on the latter can be found within these pages. Continuing from the last chairman’s piece, the following considers agri-environment schemes and archaeology: an issue with important implications to the survival and management of the sites aerial archaeologists photograph and map.

The Institute of Field Archaeologists (IFA) annual conference, held in Newcastle in April, included a session on how archaeology is involved with agri-environment schemes throughout the UK. Agricultural activity has for long been recognised as one of the greatest threats to archaeology in the UK and Ireland. In England, the publication in 1998 of the Monuments at Risk Survey quantified and demonstrated that agriculture poses the greatest single threat to the archaeological resource in the country. Reform of the European Union Common Agricultural Policy has shifted the emphasis from production-linked subsidies to agri-environment schemes whereby farmers are offered grants to sensitively manage both the natural and built environment, including protection of archaeological sites, and public access. In a time of change for agriculture in the UK, and with predicted increase of applications, agri-environment schemes evidently offer an important opportunity for the protection of rural sites.

A number of factors influence how effectively archaeology can be protected, however. The key objectives of agri-environment schemes tend to be ecology, landscape and access, followed by the historic environment as a “poor relation”. In addition, archaeologists currently have no say in which sites enter the schemes, as it is the choice of the farmer whether to apply. Most importantly, however, the IFA session highlighted the variation in resources and approaches employed throughout the UK by archaeological organisations providing information and advice to those preparing applications for the schemes. In some places, such as Dyfed and the Peak District National Park, areas considered for inclusion have a pre-application survey to identify new sites, and involve site visits to advise on management of sites. In areas where resources for the local/regional archaeological unit are limited, however, only basic audits of known sites are prepared and often no site visit is made at all. In terms of enhancing protection and management of the archaeological resource, it is evidently as a case of “reaping what you sow”…

Addressing the question of which sites are included in such schemes, archaeological advisors in part of England are now attempting to target particular sites and areas in attempt to have them included. Buried sites in arable land, those commonly known as cropmark sites, are perhaps the most difficult class to have considered for inclusion. The cash incentives are arguably not enough to convince farmers to change land-use on a site that he/she cannot see, particularly if the change in regime may have a knock-on effects, such as sowing only parts of a field to grass or interfering with crop rotation cycles. An area where cropmark sites are actively targeted for management is the Stour valley in the Essex-Suffolk border, and I am happy to include within the concluding part of the Stour valley project article. I am indebted to our editor for his constructive comments, and welcome thoughts from others on both the archaeology described and the issues concerning agri-environment and archaeology in general.
Verticals/Obliques: seventh note

The season 2001 is yet another in which we have to report no progress in the project to compare vertical and oblique photography over the same sites at the same time. Of the ten trial areas, we flew past six of them, finding a grand total of one crop mark between them. Granted, we were using oblique methods for our brief examination, but I doubt if even the proponents of vertical photography would have thought it worth while mounting a full-scale comparison in those circumstances.

Regarding the installation of the vertical camera in the aircraft, which those attending AARG last year may have slept through, the position is that the set-up has been useable with English Heritage’s Rollei 6008 since June this year. Such use has been with manual triggering of the camera, using a remote button and a stop-watch. The intervals for photography are obtained from tables, using the height above ground level, the ground speed and the focal length of the lens, given the overlap required. The latest development is to use a lap-top computer to fire the camera at the required intervals, via a purpose-made interface. This arrangement has been tested on the ground, but not yet in the air.

The vertical set-up is still not entirely satisfactory with the Vinten F95 camera; you may recall that there was a problem with blurring of images, particularly around the margins. The sharpness problem has been addressed by checking that the focus was set at a sensible distance (1500 feet), combined with mechanical checks on the distance from film plane to lens mounting points on the camera. The focus of all three lenses seemed to be set at about 300 feet and correction of this has given improved sharpness for the two Leitz Canada lenses, at least. Presumably this focal distance reflects the RAF surplus origin of the camera and lenses! Air testing has been carried out and the results are an improvement, but further checking continues.

Anthony Crawshaw (for the Working Group)

Rosia 2001: Pete Horne describing his birthday flight with Otto while Roberto (one flight was enough) Goffredo listens avidly....
Siena 2001 – Aerial Archaeology Research Week


Cathy Stoertz

The third in AARG’s occasional series of European training courses took place near Siena in May, with principal support from Culture 2000, the University of Siena, English Heritage and the Association for Cultural Exchange. Months of advance research, reconnaissance and negotiation by Otto Braasch, Bob Bewley, Rog Palmer and above all Chris Musson ensured that this course, the most ambitious to be planned so far, was a great success for students and tutors alike.

The University of Siena, its staff and students provided immeasurable practical assistance. The enthusiasm and support of Prof. Ricardo Francovich made many things possible, including the appearance of no less than 6 computers, enabling the Ground School to offer plenty of hands-on experience of photo transformation (via AirPhoto). Stefano Campana acted as Siena contact and general problem solver – supply co-ordinator, booking agent, taxi driver, and whatever else we needed – while still fulfilling his role as a student on the course; and Cristina Lericci ran numerous errands and endlessly shuttled films to the lab, returning with eagerly-awaited prints.

Otto Braasch co-ordinated the Air School and Otto, Klaus Leidorf and Mick Webb provided piloting services and in-flight instruction with patience and good humour. Damian Grady took on the crucial roles of film monitor, camera co-ordinator and GPS master, the latter task often keeping him computer-bound into the early hours of the morning. Chris Musson, Darja Grosman and Bob Bewley bridged the gap between Air and Ground School, keeping order at the airfield, offering assistance wherever needed and discussing both photographic and archaeological results with the students.

The Ground School team comprised Rog Palmer, Pete Horne, Michael Doneus and myself, with Cinzia Bacilieri as resident translator (who, having translated everything each of us said not once, but twice, could probably teach the next course single-handed!). We found the enthusiasm and dedication of the students ample compensation for our confinement to a darkened lecture room despite perfect weather.

The statistics below can only hint at the week’s achievements –

33 participants from 7 countries (21 students, 3 pilots, 9 tutors):
   22 Italian, 2 German, 1 Austrian, 1 Slovenian, 7 combined British (5 English, 1 Welsh, 1 trans-Atlantic).
   Plus guest lecturers from Italy and Czech Republic.

<table>
<thead>
<tr>
<th>Aircraft statistics:</th>
<th>Pilot</th>
<th>Sorties</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otto Braasch</td>
<td>21</td>
<td>41 hrs 51 mins</td>
<td></td>
</tr>
<tr>
<td>Klaus Leidorf</td>
<td>21</td>
<td>46 hrs 59 mins</td>
<td></td>
</tr>
<tr>
<td>Mick Webb</td>
<td>22</td>
<td>39 hrs 11 mins</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>64</td>
<td>128 hrs 01 mins</td>
<td></td>
</tr>
</tbody>
</table>
The resulting 175 films added 6,300 photos to the sum of Italian archaeological air photographs. Careful calculations reveal that, with a shutter speed of 1/500th of a second per frame, the collective camera shutter was open for a grand total of 12.5 seconds. Mathematically inclined readers will realise that this leaves 128 hrs 47.5 seconds of flying time unaccounted for. Rest assured, however, that the remaining time was not wasted – assuming an average aircraft speed of 80 knots, the total distance flown during the week was 16,388 kms (10,242 miles), which is nearly halfway round the world! At this rate, who knows where we will find ourselves next time..?

Rosia 2001. Assorted ground school with a central mealtime pair showing Mick Webb and Sofia Pescarin deep in a discussion about ?flying…
Territorial study through aerial photography: the Siena 2001 experience

Federica Santagati

This contribution was offered by one of the students who attended the third course on aerial photography and interpretation in which AARG has played a major part. If Federica’s comments are representative of the general student opinion then I think we can consider the Italian course to have been very successful. Thanks go to Chris Musson for editorial work on this contribution.

Because I believed them to be extremely useful from the methodological point of view, I had already attended some lessons in aerial photography on the postgraduate course at my own university before taking part in the Aerial Archaeology Research School at Siena, jointly organised by the AARG, English Heritage and the University of Siena. These earlier lessons consisted of (a) projection of slides, and (b) use of the stereoscope. We also had the support of texts for understanding, on the theoretical level at least, the basic ‘workings’ of the technique. Attending these lessons, however, certainly did not give me any possibility of understanding the mechanisms of aerial photography in really practical terms. I continued to be involved on the fringe of an activity that was potentially useful to me, but which I only knew partially. Certainly this type of course, with only theoretical experience, had not equipped me with the necessary skills, for instance, for taking aerial photographs myself, or for rectifying oblique photos.

Patience, helpfulness, experience – these are the things I found in Siena. Teaching a group of foreigners in a foreign land is not an easy undertaking for anyone.

Patience is required, especially when the teaching takes place in an 'unreliable' country such as Italy, where – to cite just one of the classic problems of my nation – the airports can even shut down at lunchtime!

Helpfulness ... always there in plenty from the tutors, who were always ready to answer even the smallest of questions, at any moment during the lesson – and I can assure you that with the lessons being in a foreign language, doubts about having understood what was said sometimes arose.

Experience … most certainly necessary to create such a well-structured plan of lessons. We all appreciated how this plan helped us understand how one makes use of an aerial photograph with the computer and the advantages one can draw from this for specialised research. Indeed, the explanations started from the ‘beginning’, and told us everything concerning the type of film and cameras to be used, and used video films to show how one prepares for the flight – the most exciting part, especially for those who have never flown in small aircraft with just four seats.

The way the course was planned, organised with lessons relating to the various topics regarding aerial photography, from the flight itself to photo-interpretation and the various uses of the computer, may seem to be something to be taken for granted, but in practice it is
not. I can state that all the efforts made by the tutors paid dividends in that everything fitted together well at the logical level, even in the ‘impenetrable’ minds of us neophytes.

The lessons on the human perception of the images were particularly interesting, completely unexpected and rich in moments of reflection on the functioning of our brains, an aspect considered only minimally in my earlier course on aerial photography. Certainly we all appreciated certain lessons very much, such as those relating to the ‘control points’ to be taken in the photos, the transformation of these by means of the computer and the use of the GIS. This last was in my opinion one of the most important lessons of the course, given that this methodology and these techniques are now widespread at a ‘high’ technical level (which nowadays is the only level that counts!) and one cannot not bear it in mind. The absence of this element in the course syllabus would most certainly have been a grave lacuna.

I don’t know how many of us students found ourselves flying with three tutors (pilot included). On the third day, by pure chance, I was lucky enough to do so and I felt it was one of the most educational of all the flights I made. Listening to the comments or the ultra-technical suppositions, for example on a ‘probable crop mark’ that I had not taken into consideration even minimally in flight, was certainly important. From that flight I truly did learn very much. Just as I did from the close examination, under the guidance of one of the tutors, of the photos I had taken during the flight. The observations on how one could have taken pictures in order to obtain better results for research purposes were equally important. This precious advice constituted a seminal moment in my learning.

The only black mark? The time spent waiting to fly was not filled with other exercises or explanations. Perhaps some activities could have been planned for those people who were waiting for their turn. This time could have been used at the least for studying the photographs that the students had taken in their earlier flight, though this of course depended on the rapid delivery of prints from the photo laboratory – one of the practical problems not fully solved at Siena.

What can one say of the pilots? To be able to reassure someone on his or her first flight on board a small aircraft is no small achievement. I know that all three of the pilots are highly competent, given that on the evening of the first day we all exchanged opinions on the subject. The discomforts of the following days – and there were some – were all simply caused by the heat in the aircraft cabin. The helpfulness of the pilots was always at maximum in every case, from turning back when someone felt unwell, to making several passes over an area that particularly interested us. In the case of the two German pilots we were also able to count on their great knowledge and competence in the archaeological field.

Today, after going through the course, I cannot pretend to know how everything regarding aerial photographs functions in close detail. Even with the distracting movement of the aircraft, however, I was able to recognise a Roman villa that no one else in the aircraft had yet seen – one of those classic examples worthy of a manual. Perhaps this depended more on good luck than anything else! But my approach to these themes has certainly changed. I know that I will use the research funds of my university (if they are sufficient) to pay for a pilot so that I myself might take photographs of a Roman aqueduct that I am studying, in those areas where it disappears underground and all surface traces of it are lost.
During the course in Siena I myself did not take a great number of photographs from the aircraft because – due to a considerable dose of lack of confidence – I did not feel I was up to taking good photographs. Now I have full confidence in myself because the photographs taken on my first day appeared to be of good quality. I like taking photographs, and flying too! Indeed, I almost forgot to tell you that I have decided to take my pilot’s licence. I’m just waiting for the pilots I have met ... to offer me a discount!

The author wistfully wondering why the picture of ‘her’ villa is not in this space, while Klaus Leidorf – who has the photos – grins evilly....
Kodak drop PhotoCD

Anthony Crawshaw

About six months ago Kodak quietly dropped their PhotoCD service, which I had been using since its introduction. PhotoCD was aimed at the retail market and was a way of getting complete films digitised, at the time of processing, at reasonable cost. In addition, PhotoCD used a film of gold as the recording medium, rather than the usual aluminium. The claimed advantage of the gold film was archival quality, with a quoted life expectancy of one hundred years. The replacement service offered is called Picture CD, which produces JPEG files, instead of the special format used by PhotoCD. I suspect that the reason for this move was that PhotoCD never really caught on, combined with the ready availability of cheap scanners for PCs. Unfortunately Picture CD has only got half the linear resolution of PhotoCD, so represents a backward step.

This note describes a limited trial of Picture CD and two alternatives that I have found, which do have the same resolution as the standard, fifth, resolution of PhotoCD. This fifth resolution of PhotoCD had a 35mm. frame digitised at 2048 X 3072 pixels, to give a file size of 18 Mb. There was a sixth PhotoCD resolution offered, aimed at the professional market, which was digitised at 4096 X 6144 pixels, to give 72Mb files, which I have not been able to find an equivalent of, at reasonable price.

Picture CD has a maximum resolution of 1024 X 1536 pixels, called ‘large’. The two alternatives to Picture CD that I have tried are provided by Colab and Jessops, both of which also offer an ‘extra large’ resolution, called ‘Super Res’ or something similar (I believe that Boots also offer a similar service). Both these ‘extra large’ resolutions are the same as PhotoCD’s fifth resolution, i.e. 2048 X 3072.

Because PhotoCD used a different data compression routine to that used in JPEGs, one can not sensibly compare file sizes. However comparisons can be made between the providers of JPEG files, which gives an indication of the degree of compression used when creating the file, and thus degradation by comparison with the original image. Comparing the ‘large’ file size, which enables Kodak Picture CD to be included, results were as follows:-

<table>
<thead>
<tr>
<th>Provider</th>
<th>Size (Mb)</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Picture CD</td>
<td>0.4 – 0.7</td>
<td>Price uncertain</td>
</tr>
<tr>
<td>Colab ‘Crystal Pix’</td>
<td>0.5 – 1.1</td>
<td>Scans + 2 sets 5 x 7 inch prints, £26.00</td>
</tr>
<tr>
<td>Jessops</td>
<td>0.6 – 1.1</td>
<td>Scans + 2 sets 5 x 7 inch prints, £22.50</td>
</tr>
</tbody>
</table>

Although these were not the same negatives that were digitised by all three services, the films were all 36 exposures, largely aerial photographs, and so I hope that sensible comparisons may be made; such suggest that the Kodak Picture CD has more compression than the other two services. In all cases, including PhotoCD, magnification of the digitised image showed that pixellation set in before the grain of the 100 or 200 ASA film became evident. The only service problem that I have had was with Colab, who once failed to include the ‘extra large’ file size that I had paid for; this was rectified without quibble, but does point to the need to check the results when you get them back.

Colab Ltd., Herald Way, Coventry, CV3 1BB 024 7644 0404
Jessops and Picture CD, High Street near you.

D. Strachan

1 Introduction.
The Stour river valley is best known through the paintings of the Dedham Vale by Constable, however it is also host to a remarkable concentration of prehistoric ritual and funerary monuments that appear, often with great clarity, as cropmarks (Strachan 2000). While nature conservation and enhancement of landscape value and is well established, by way of AONB and ESA status, the appreciation and management of this considerable archaeological resource has lagged behind. In addition, in contrast to a number of field-walking projects, carried out by local societies, developer-led archaeological work has been largely absent, and our current understanding of these landscapes is restricted to the size, morphology and landscape setting of the cropmark information. Despite limited development threat, much of the valley has been subject to intensive arable cultivation for many decades, an activity highlighted as the greatest single threat to the archaeological resource by the Monuments at Risk Survey (Darvill and Fulton 1998, 236-237). Both the English Heritage Draft Research Agenda (EH 1997) and the Eastern Counties Regional Research Framework (Brown and Glazebrook 2000) have stressed the need for increased synthesis. The initial stage of this project has aimed to quantify the extent and nature of the resource, as known, and to develop a longer-term programme to enhance understanding and management. Following from the methodology described in AARGnews 20 (Strachan 2000), the following outlines, in summary, results of the study, a fuller account of which is to be published in Landscape History (Brown, Knopp and Strachan forthcoming).

2 A Morphology of Enclosures.
A simple morphology for enclosures was devised to allow study of the “Monument Complex” class, enclosures interpreted largely as round barrows, long barrows, long mortuary enclosures and cursus monuments. Mapping within GIS allowed both the creation of distributions of sites of similar size and shape, and cumulative viewshed analysis (CVA) to be carried out on selected site types (Strachan 2000, 29-30). On morphological grounds, the following classes of site were identified:

- A: Simple ring-ditches (i.e. one enclosing ditch).
- B: Dual concentric ring-ditches.
- C: Triple concentric ring-ditches.
- D: Elongated curvilinear enclosures.
- E: Elongated rectilinear enclosures.
- F: Other rectilinear enclosures.

Class A was further sub-divided into circular sites and sub-circular sites, as it is evident that some ring-ditches show a high-degree of accuracy in their lay-out, while others appear eccentric. Similarly, other enclosures also display variations in their degree of symmetry, and thus categories B-F were also suffixed with the p (perfect) or e (eccentric), indicating whether sites showed a high degree of symmetry, or were in some way eccentric in shape (i.e. non-symmetrical).
3 The distribution of cropmarks and nature of the enclosures.

An acknowledged important factor effecting the overall cropmark distribution is contrast between the alluvium, terraced valley gravels and glacial sands and gravels along the river valley itself, and the Boulder Clay, with pockets of underlying London Clay, that occur in the surrounding environs. The cropmark distribution is heavily concentrated along the free-draining river valley, with relatively few sites being recorded on the clay areas. When these do appear, they tend to take the form of former field boundaries, probably of medieval or post-medieval date, and rectilinear enclosures, usually associated with the Iron Age in the area. While it is apparent, therefore, that the geology of the area affects the overall cropmark distribution, the concentration of cropmark sites along the river-valley would appear to reflect a true concentration of certain archaeological sites (ring-ditches, and elongated enclosures, both curvilinear and rectilinear) in that landscape zone. These classes of site are given some consideration here:

3.1 Simple ring-ditches.

Of the 285 simple ring-ditches (from the total of 334 individual monuments) only 6 were described as sub-group Ap (“perfect” circles), with the remainder being sub-circular. The sites range in diameter from c.4.6m (interpreted as a barrow within the nucleated barrow cemetery at Catawade) and c.70m (a sub-circular enclosure at Lamash, interpreted as a domestic or agricultural enclosure of possible later Bronze Age or Iron Age date).

![Graph showing diameter distribution of simple ring-ditches](image)

Fig. 1: Simple ring-ditches (classes Ap and Ae) displayed by diameter on the x-axis and frequency on the y-axis. It was found that the sites with a diameter of 10m or less most commonly occurred in nucleated cemeteries, where they were interpreted as barrows or funerary ring-ditches.

The vast majority of ring-ditches are interpreted as round barrows. The considerable variation in ring-ditch size, and how that may relate to barrow form, is worthy of consideration. It is noticeable that ring-ditches range from having a small diameter (with relatively wide ditches) to having a large diameter (and relatively narrow enclosing ditch). Sites of a similar diameter can have noticeable variations in ditch width, indicating possible differences in profile.

Figure 2 shows this diversity schematically while attempting to relate these factors to the most likely profiles of barrow-type, based on Ashbee’s classic typology (Ashbee 1960, 24-29). A wide ring-ditch of small diameter will produce a larger amount of up-cast material, relative to the enclosed area, than a ring-ditch with a large diameter and a narrow ditch. The profiles of barrow-types has been ordered to reflect this, with large amount of up-cast (relative to internal area) at the top and small amounts of up-cast (relative to internal area) at the bottom (Fig. 2). It is acknowledged that this argument does not take into account either disposal of some of the
ditch up-cast elsewhere or the addition of material to the mound from another source. However, it would still appear to be a useful model from which to consider some of the larger ring-ditches in the area, particularly the significant number of sites that fall into the 20-30m and 30-40m categories. It is suggested that the larger examples (c.20-40m) are likely to represent “fancy” barrow-types, more commonly associated with the Wessex chalk-lands (e.g. Ashbee 1960). It is acknowledged that there is debate as to what extent the width of cropmarks of ditches can seen to accurately represent the true width of the buried ditch. In instances where a composite plot is made from several years of photography, however, the argument for a more accurate representation of width must surely be increased.

Fig. 2: Profiles of barrow types based on Ashbee (1960) shown on the left, have been ordered by the amount of up-cast produced from the ditch, relative to area enclosed (large amount at the top to a small amount at the bottom). Note that the profiles are schematic and diameter of ring-ditch and ditch widths shown in section are not to scale. The right-hand column shows the diversity of ring-ditch dimensions ranging from small ring-ditches with relatively wide ditches, to larger ring-ditches with proportionally narrower ditches. It is suggested that consideration of ditch width, relative to enclosed area, may indicate profiles of barrows. Sites of a similar diameter can display noticeable variation in ditch-width, which is likely to be indicative of differences in construction (copyright: Essex County Council).
Simple ring-ditches occur all along the river valley, with noticeable concentrations around the major monument landscapes at Stratford and Bures. Areas where they are absent occur to the north and south of Sudbury, and along the stretch of river to the east of the Bures landscape. While it is possible that this distribution is the result of geology or land-use (e.g. pasture), other cropmarks do appear in these areas, albeit in reduced numbers, which would indicate that these concentrations may be a genuine indication of monument distribution. This question can only be answered by more detailed analysis of land-use and cropmark formation in the area, however.

3.2 Clusters of Simple Ring-Ditches.
Coherent groups of ring-ditches fall into three categories: Nucleated, Linear (defined here as four or more sites within 100m of each other) and Dispersed (Ashbee 1960, 34). Examples of each type are present within the study area and details are outlined below:

3.2.1 Nucleated cemeteries.
The most common form of ring-ditch cluster, interpreted as barrow cemeteries, was nucleated, with 14 examples. A common feature of the nucleated groups was the occurrence of a cluster of small ring-ditches (c.5-15m in diameter) positioned near a much larger, often dual concentric example (Fig. 3). This was found to occur at 8 of the 14 nucleated groups. It would seem reasonable to suggest that this may represent development of the monument complex over time, with the smaller barrow cemeteries being added to an existing site. There are four examples of nucleated groups that contain only small ring-ditches (c.5-15m range), and two groups that consist of only larger examples (c.15-40m). There are good comparisons between many of the Stour monument complexes and the excavated Bronze Age cemeteries at Ardleigh (Brown 2000) and Brightlingsea (Lavender 1996). The latter consisting of a c.20m diameter dual concentric ring-ditch of early Neolithic date with a nearby nucleated earlier Bronze Age cemetery of closely spaced small ring-ditches.

Fig. 3: An example of a nucleated cemetery at Wormingford (Group 49). The course of the modern river is shown at the top right, with a possible former course shown as a broken line. A common feature of this class is the location of a nucleated cemetery of small barrows positioned near a much larger, often dual concentric example (copyright: Essex County Council).
3.2.2 Linear cemeteries.
A total of 6 groups were found to have a linear arrangement, which contained between 4 and 6 ring-ditches. It was noted that 3 of the alignments appear to “cut-off” a meander of the modern river (Fig. 4), a feature also noted at both of the cursus sites. The ring-ditches that make up the linear arrangements generally fall within the 15-50m-diameter range. This is in contrast to the nucleated groups, which generally consist of smaller-sized ring-ditches focused around one or two larger examples.

Fig. 4: A linear cemetery at Wormingford (Group 50). The alignment can be seen to “cut-off”, or enclose, the meander of the river. This characteristic can also be noted at both of the cursus sites, and at the Kedington causewayed enclosure (copyright: Essex County Council).

Fig. 5: A dispersed barrow cemetery at Chapel Street (Group 6), containing ring-ditches ranging between c.15 and c.35m in diameter. Dispersed groups were found to usually include sites with a considerable variety in size (copyright: Essex County Council).
3.3 Dual concentric ring-ditches.

A total of 21 ring-ditches were found to be dual concentric, the distribution of this class having three areas of concentration: Cavendish to Long Melford; around Bures; and Stratford St. Mary to the estuary. The sites range in size from around c.15m to c.60m in the diameter of the external ditch. Two distinct classes of site are noticeable. The first have an internal ring-ditch which is relatively small in comparison to the external ring-ditch, hence the former encloses a small area relative to the latter (Fig. 6 A-N). The second have internal and external ditches of a relatively similar size (Fig. 6 O-U). In the latter instance, the internal ring-ditch encloses a larger area, relative to the outer-ditch, than in first class.

It is worthy of note that there would appear to be concentration of dual concentric ring-ditches along the Stour River valley. The Essex National Mapping Project have recorded a total of 24 dual concentric examples over the whole county, eight of which are situated on the Essex side of the Stour study area. With a total of 21 dual concentric examples along the Stour alone, the site-type is evidently more common here than along the Chelmer Blackwater or other river valleys. The sites are important as they are likely to represent development and re-use of earlier monuments, while some of the out-sized examples represent monument types which are difficult to accommodate within traditional classifications.

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Fig. 6: Dual concentric monuments arranged by size and morphology. Sites A-N have a relatively large difference between the size of the individual ring-ditches, while sites O-P have ring-ditches of a more similar size (the former group enclosing a smaller area, relative to external ditch size, relative to the latter (copyright: Essex County Council).
3.3.1 Dual concentric sites with a relatively small internal ditch.

This group (Fig. 6, A-N) appears to fall into three sub-groups, defined by size: the two noticeably large sites at Belchamp St. Paul and Langham (Fig. 6 A and B); four sites between c.20m-c.40m in diameter (C-F) and several between 15-20m (G-N).

A good comparison for these sites can be found, for example, in the excavated Neolithic and Bronze Age Monument Complex at Barrow Hills, Oxfordshire (Barclay and Halpin 1999). The dual concentric site Barrow 12 was found to have been constructed in two phases. The internal ring-ditch (c.10m in diameter) was constructed around a central articulated male skeleton and produced a radiocarbon date of 2330-1950 cal BC at 2 (3720±60 BP: BM-2699). The external ditch (with a diameter of c.20m) was added, and found to date from the early Bronze Age, 1980-1590 cal BC at 2 (3450±80 BP: OxA-1872, ibid 97-102). It is likely therefore; that some of the dual concentric sites in the Stour represent multi-phased developments with one ring-ditch added to another. In sites of a fairly small size (i.e. G-N), but with a relatively wide ditch, it is likely that these sites were bowl barrows with internal mounds. With the very large examples cited above (Fig. 6 A and B), however, it is more likely that the outer ditches represent “fancy barrows”, such as Bell-disc barrows, or Disc barrows, perhaps incorporating the earlier barrow represented by the internal ring-ditch.

3.3.2 Dual concentric sites with ditches of a similar diameter.

This group contains two outsized examples at Wormingford and Higham (Fig. 6 O and P), which are in excess of 40m in diameter, and several examples between c.20-40m in diameter (Q-U). While with the latter group it is possible that the multiple ditches may represent multi-phasing, the larger examples, and the Wormingford site in particular, may represent a single phase of construction.

4 Elongated monuments.

Elongated is usually defined as describing a width to length ratio of greater than 2:1. Using this definition, ten elongated sites were recorded by the project (Fig. 8 A-J). A number of sites, however, tend towards elongation, but fell short of the criteria (Fig. 8 K-Q). These sites are not sub-circular, and are perhaps best viewed along with the elongated class and described as oval. It is noticeable that the oval sites are smaller than the smallest of the truly elongated examples, and they are therefore defined on two sets of criteria: shape and size. The elongated monuments therefore fell into three categories; the morphologically diagnostic cursus monuments, being rectangular, elongated curvilinear monuments, and oval monuments. The elongated curvilinear monuments are generally interpreted as long barrows and long mortuary enclosures (Fig. 8 C-J), and many of the oval class have been suggested as small long mortuary enclosures or oval barrows. The quantity and variety of elongated monuments along the Stour valley would indicate an important funerary and ritual landscape in the earlier prehistoric. Aerial photography continues to add detail to known sites, as with the row of pits first recorded in 1996 running inside the enclosing ditches at Bures (Fig. 8 F and 9). It has also been successfully employed as a tool for broader study of the site-types, as with a recently published study of Neolithic elongated enclosures in Lincolnshire (Jones 1998), where study of cropmark sites dramatically increased the number of long barrows recorded in the county. Given that the group are easily identifiable, and are likely to represent the earliest monuments in the landscape, they are of considerable importance to understanding the development of activity along the Stour both with regards to individual monument complexes and the valley as a whole. The MPP scheduling enhancement programme in 1999 looked at the cropmark evidence for long barrows and long mortuary enclosures in Essex. This resulted

AARGnews 23 (September 2001)
in the scheduling of one additional site in the Stour area (Fig. 8 Q), and the recommendation of targeting future aerial reconnaissance towards other sites. A number were rejected, however, including the convincing long barrow at Dedham (Fig. 8 G), and the unusual elongated monument at Bures (Figs. 8 F and 9). The classes, and individual sites belonging to them, are discussed below.

4.1 Cursus monuments.
Two cursus monuments are known within the study area; Bures St. Mary (Fig. 7 and 8 A) and Stratford St. Mary (Fig. 8 B):

Fig. 7: The cursus at Bures St. Mary (the hatched area showing gravel extraction) and a linear and nucleated cemetery at Mount Bures to the south of the river. Both the cursus and the linear element of the barrow cemetery “cut-off”, or enclose meanders in the river by their position, running along the 20m contour (copyright: Essex County Council).

4.1.1 The Bures St. Mary cursus.
The western end of this site was destroyed by gravel extraction prior to 1960. The surviving length of the cursus is around 190m, however, with a width of c.24m (Fig 7). The cursus has two entrances, the first on the southern boundary in the middle section of the enclosure, and the second on the northern boundary at the eastern terminal. In addition, the cursus encloses a circular pit (c.5m in diameter) and a ring-ditch (c.10m in diameter) both positioned on the central line of the cursus near the eastern terminal, beside the latter entrance. The site is situated just above the flood-plain of the north bank of the river, running along the 20m OD contour. With a WNW-ESE orientation, the cursus is positioned to the north of a SW reaching
meander of the river. In this location, the length of the cursus “cuts-off”, or encloses, the area of flood-plain created by the meander.

4.1.2 The Stratford St. Mary cursus.
The cursus at Stratford St. Mary (Fig. 8 B) has for long been bisected by the village’s Upper Street, and development post-1960s has seen the destruction of a large part of the eastern half of the site, including the northern terminal and an outlying ring-ditch. Fortunately, most of the specialist air photographs pre-date these developments affording a fairly complete plan of the site to be made. The site was 290m in length with a width of around 60m (c.60m at the NW terminal, and c.57m at the SE terminal).

While there is no evidence of any internal features, the site may have a second, partially constructed NE side. Mapping of this feature was complicated by numerous overlying rectilinear features, and by the “disjointed” nature of the cropmark evidence (particularly linear features bisected by Upper Street). The site also appears to be slightly curved, or to have had a slight angular turn in it’s mid-section.

This characteristic can be seen, in a more exaggerated fashion, at the cursuses at Fornham All Saints, Suffolk, Maxey, Cambridgeshire, and Dorchester on Thames, Dorset. The composite plot created, however, would suggest that the second NE ditch might have formed part of the cursus construction, possibly an alteration. Interpretation is complicated by the slight change in orientation of the monument, and the fact that the change in angle would have occurred on part of the site for which there is no evidence.

The site is orientated NW-SE, and like the Bures St. Mary example, appears to “cut-off” or “enclose” a SW reaching meander, although in this case a much larger one. Unlike the Bures St. Mary example, however, the Stratford cursus is known to form part of a larger Monument Complex, consisting of a long mortuary enclosure and a number of ring-ditches. Two of these, which are both c.20m in diameter, are positioned at either end of the cursus. While these may or may not be contemporary with the cursus, they are evidently related to some phase of its existence.

4.2 Elongated curvilinear monuments.
A total of eight elongated curvilinear enclosures were recorded (Fig. 8 C-J) ranging in size from the probable long barrow at Dedham (G) which measures 43m in length by c.19m width, to the possible long mortuary enclosure at Stratford St. Mary (C) which is 116m long and c.24m wide. These sites can be divided both by orientation, and the appearance of entrances. Three of the sites (F-H) have clear entrances, with the unusual Bures site (F) being more “open-ended”. Both the Dedham and Bures examples have eastern and western entrances, the former showing a pit feature apparently blocking the eastern entrance. The orientation of sites tends to be directly east, or SE, with a single possible example, which has a NE orientation. A good comparison for sites C-J can be found in the excavated long mortuary enclosure at Rivenhall (Buckley et al 1988), where a Neolithic date was suggested on the basis of limited trial trenching.

4.2.1 Oval monuments.
A total of 7 sites were classed as sub-elongated (Fig. 8 K-Q) on the basis that while they were not strictly elongated, they appeared more elongated than sub-circular. The sites are all less than 30m long and tend to be around half as broad as their length. These dimensions would suggest oval barrows, as defined by the MPP class description, rather than small long mortuary enclosures. This site-type has a distribution from roughly Dorset to Norfolk, while
the example from the NE of Springfield cursus (Hedges and Buckley 1981; Buckley et al 1988) provides a good comparison in Essex.

Fig. 8: Elongated monuments illustrating rectangular examples, or cursuses (A-B), elongated sites (C-J), representing long mortuary enclosures and long barrows, and oval enclosures (K-Q), which are also noticeably smaller that C-J. It is possible that the latter class represent oval barrows as opposed to sites related to long mortuary enclosures or long barrows (copyright: Essex County Council).

5 Evidence for Phasing and the Development of Monument Complexes. 
A total number of 367 individual sites were recorded within the “Monument Complexes” class. There were, however, only five examples of sites where one monument was clearly constructed over the other, without respecting the former monument, and presumably involving partial or total levelling. Details of these sites are here summarised:
Fig. 9: The unusual elongated monument at Bures (see Fig. 15) photographed in 1996 and showing a line of internal pits running along the inside of the northern boundary ditch. The site is situated just above the flood-plain on the south side of the river, across from the Bures St. Mary cursus (the river runs to the left of this photograph). These sites are situated around 19km inland from the estuary head, where the river takes a sharp turn to the north. It is of interest that the Springfield cursus is positioned around 15km inland from the Blackwater estuary at a point where the Chelmer river also makes a significant turn north. Both the Bures St. Mary and the Springfield cursuses have circular features at the eastern terminal (©Essex County Council, photo: D. Strachan).

Long Melford  The site includes two probable long mortuary enclosures (Fig. 8 D-E and Fig. 10), both constructed on an NE-SW alignment running parallel to the river Stour, but on a junction with a tributary. Both enclosures are constructed on the same site as two simple ring-ditches. The dispersed group contains several other simple ring-ditches with a wide range in size.

Wormingford  A ring-ditch of c.26m in diameter has a smaller ring-ditch of c.12m in diameter constructed over its west side. The complex takes the form of a linear barrow cemetery, which encloses a meander of the river (Fig. 3).

Higham  The ditch of a 52m-diameter ring-ditch has an 18m-diameter ring-ditch constructed over the southern stretch of ditch.

Higham  A c.36m diameter ring-ditch has a sub-elongated curvilinear monument constructed over the western arc of the ditch.
It is particularly striking that three of these five sites involve the coincidence of a circular monument and an elongated, or sub-elongated, monument. In the examples at Long Melford (Fig. 10) the possible two long mortuary enclosures appear to have been replaced with ring-ditches, and it would appear that the earlier monuments must have been partly levelled by the construction of the later ones. Other examples show a significant overlap of monuments, although these tend to involve a smaller monument coinciding with the ditch of a significantly larger one. Both examples that involve the coincidence of ring-ditches follow this configuration. It is assumed that the individual elements within monument complexes developed over very long periods of time, and it is suggested that the above sites are of particular importance for the understanding of the processes involved in the development of the landscape. While it is possible to suggest phasing of groups by the plans afforded by rectified cropmark features, only excavation will provide details of the relationship between sites.

![Diagram of Long Melford site](image)

**Fig. 10:** The multi-phased monument complex at Long Melford, including a pair of long mortuary enclosures and presumably later ring-ditches (copyright: Essex County Council).

## 6 Monument Complexes and the rectilinear landscape.

Another major feature in the study area is the extensive rectilinear landscape. While the field-systems and boundaries remain undated, it is probable that many date from the Medieval and Post-Medieval periods, with a smaller number which may be of later prehistoric date. At many of monument complexes, the rectilinear landscape can be seen to respect ring-ditches suggesting that many of the sites survived into later history as substantial earthworks. A total of 15 monuments have rectilinear systems that respect their position, while 16 monuments are cut by linear features, indicating that they were already levelled, or were levelled at the time of construction of the linear system (Fig. 11).
7 Discussion.
It is clear from the concentrations of monuments within the study area, that the river valley was chosen for the construction of the earliest ritual and funerary monuments of the Neolithic. It is also clear that particular locations were favoured within the river valley. These earliest monuments were noticeably elongated, including the cursuses, the long mortuary enclosures and the probable long barrow. In addition, some of the ring-ditches may also be of Neolithic date, possibly the larger, often dual concentric ring-ditches, which appear to have later barrow cemeteries constructed around them. Once established as significant places in the landscape, sites were developed and added to, and equally the new relationship between human society and the landscape would continue to develop (Bradley 1998, 2000). While initial study of the distribution of these sites suggests a simple linear relationship along the river, vewshed analysis has shown that even the relatively low topography of the area tends to give a sense of enclosure, defined by the surrounding valley slopes, to the locations chosen. Considering the tendency for the linear elements of the monument complexes to cut-off, or enclose, meanders in the river, it would appear that the idea of “enclosure” was a consideration in wider landscape terms, during the construction of the monuments – enclosures in themselves. It is noticeable that considering the number of monuments constructed, only a very few, however striking, exhibit an overlap that would suggest complete destruction of one monument type and the replacement of another. The pair of elongated monuments at Long Melford, presumably being replaced by ring-ditches would make it a rare example of this type of development. Finally, the appearance of the rectilinear boundaries and field systems, presumably associated with an increasingly pastoral landscape (e.g. Pryor 1998) is clearly illustrated as post-dating the ritual and funerary monuments. Importantly, in half of these instances the rectilinear features appear to respect the earlier monuments that were often clearly still impressive upstanding elements of the landscape.
8 Future work.
In the future it is hoped to build on this initial stage of work with the following approaches:

8.1 Field-based
Mapping and morphological study of the cropmark information has allowed assessment of the resource, and broad preliminary interpretations to be made. It is hoped that fieldwork, in the form of field-survey, geophysical survey, and selected excavation aimed at exploring the date and function of the monuments and their relationships, could test and develop the interpretations offered.

8.2 Desk-based
The additional use of existing complimentary sources, such as historical mapping and vertical photography (introduced as mosaics within the GIS) would prove useful in quantifying the nature of comparative land-use change, and in assessing the nature and extent of movement of the river course over time.

8.3 Management
An important aspect of the project is the aim to improve management of the archaeological resource. It is hoped that this could include the targeting of Countryside Stewardship schemes toward key cropmark complexes and the integration of archaeological information into management schemes within the various area of landscape designation within the valley.

9 Bibliography.


Cropmarks

(defn: snippets of information that require reading and understanding to make sense)

Photogrammetry software
As part of his research into developing AirPhoto, Irwin Scollar has spent considerable effort scouring the web for software that offers image transformation. The collected information has been sent to several AirPhoto users including Michael Doneus (Vienna, Austria), Richard Hammond (Launceston, Tasmania) and Anthony Martinez (Albuquerque, New Mexico). All use remotely sensed images for their work and have made brief comments on programs with which they are familiar and some comparisons to AirPhoto. Comments range from technical notes to exclamations about prices. Some programs, for example, have been designed specifically for use with map import options available in only one country: some can be downloaded for short-period free trials: others need an institution to pay for them. There is a mine of useful information for anyone planning future purchases of such software and we are not quite sure how to make this available. After the initial burst of responses things have gone quiet as we have each been sidetracked elsewhere. Irwin Scollar has combined the web results to date into more than 5MB of zipped files which are available to anyone who wants them. They can be found on the Edinburgh University Department of Archaeology's ftp server as:

ftp.super3.arcl.ed.ac.uk /pub/baspmirror, photogram.zip

Or at Cologne at: ftp.uni-koeln.de /pc/basp photogram.zip

A small text file of edited responses from the ‘commentators’ is available from your editor:
rog.palmer@ntlworld.com

Remote sensing info
Stefano Campana has compiled what he calls a ‘raw version’ of a long list of web sites that are of relevance to a range of levels of remote sensing. Well worth a browse.

http://192.167.112.135/NewPages/REMOTESENS/REMOTE.html

Scottish interest
http://www.nls.uk/pont/ uses Mr. Sid technology to make available huge amounts of raster imagery (a 16thC series of maps of Scotland). You can zoom, in a variety of ways, to see great detail without loss of resolution.

The RCAHMS air photo catalogue for 1996 has been published (at least partially) on-line with some fine images (that may take ages to appear on some machines). This is available from the RCAHMS new-look website at www.rcahms.gov.uk/apcat1996.html

Unusual control points?
Just for once I’m not complaining about these aerial photographers who are too frightened to take off before they take photos, but throwing in a request for ‘unusual control points’. We’ve all used secondary control such as crossing plough lines, fence posts, clumps of vegetation and iron age pits, but there are a few less regular features that sometimes have to be chosen. Some years ago I was quite pleased when I was able to use dotted white lines along a road which were unchanged on verticals and an oblique of roughly the same date. More recently I did better by using a sheep from a stereo pair of Tim Gates’ photos. Use of stereo viewing showed that it had not moved between frames and one photo held sufficient control to map the sheep, while on the other the sheep became a primary control point. This example may also give the aerial photographers some idea of how they make us suffer!

Satellite imagery conference
EURISY is organising a meeting about use of satellite imagery in archaeology. This is late next year. Contact for that is Valerie Hood, vhhod@hq.esa.fr
How to get First World War APs from the Internet

Peter Haupt

It is well known that the development of aviation during World War I laid the foundation for today's aerial archaeology. Hundreds of aircrew took thousands of aerial photographs for military reconnaissance of the front-line and the hostile hinterland. Today all of these pictures are kept in public archives as historical documents and are open for evaluation, and consideration of archaeological aspects and aspects of preservation of ancient monuments as

Example 1: Châlons-sur-Marne
Taken on May 27th, 1917 at 9:00 AM at a flight height of 4,900 m, focal length: 25 cm.
View on the city from NE. Centrally in the picture the modern alley from Châlons (the Roman Durocatalaunum) in the direction of Suippes, left the Roman road from Virdunum (Verdun). A few former trackways are visible through cropmarks.
On the back two stamps with remarks written in by hand:
A. Kampfgeschwader Nr. 2 O.H.L. (battle-squadron 2 headquarters staff)
B. Flieger-Abteilung A. Nr. 270. (division)
   Aufgenommen am 27.5.17 (date)
   Führer: Gebr. Koch (pilot)
   Beobachter: L. Pauls (observer)
   Gelände: Châlons s/Marne (area)
On photographs of the hinterland the place-name is usually given while it is often missing on pictures of the actual combat. In the latter case sector-names such as "group B" or regiments, for example, are rather recorded.
well. No, not all! Article 202 of the Treaty of Versailles determined that "all military and naval aeronautical material, except the machines mentioned in the second and third paragraphs of Article 198, must be delivered to the Governments of the Principal Allied and Associated Powers" by Germany ("photographic or cinematograph apparatus for use on aircraft" is explicitly listed, by the way). Therefore all aerial photographs in the hands of the air force should have been handed over, but this was done only partially.

It seems as if some officers kept the aerial photographs they took or had access to at the end of the war, aware of their lasting military value. Today this value no longer exists, and the pictures are sold as antiques. A not insignificant part of this takes place on the internet, especially on the flea-market on the internet-auctioneer eBay (Germany) where an average of three or more German aerial photographs from WW I may be offered.

Usually these are contemporary prints sized 13x18 cm, 8,4x11,4 cm, or 16x16 cm. Remarks on the back of the picture (Indian ink on the negative and comments on the back of the prints) inform about time and place the picture was taken and the names of “Beobachter” (observer) and "Führer" (pilot). The prints are in a passable state, at least if they are put up for public sale: sometimes a few creases, seldom damage done by animals. Until now, I have only found pictures of the western front on eBay exclusively of France and Belgium. Who buys such pictures? Except myself, the alias' of the bidders seem to indicate that the buyers are mostly collectors and dealers of military objects.

Fortunately, these buyers are more interested in pictures of sectors of the front-line covered with shell-craters, less in landscapes without any larger military object. Therefore the prices for such pictures range between 15 and 35 DM. Rarer are postcards with aerial photographs printed on appropriate cardboard. They usually show single villages, from French as well as German production.

Example 2: Arnicourt (north of Rethel)
Taken on June 19th, 1917 at 12:30 PM at an flight height of 500 m, focal length: 25 cm. View on the chateau of Arnicourt which might have been a military headquarter. No features of archaeological interest. On the back no further remarks. Postcards with aerial photographs of the war zone look similar but without remarks and printed on cardboard.
The pictures hardly satisfy the prospecting archaeologist’s eye. The prints are often not sharply focused and are subject to aging. Finally the choice of subject can be criticized... The great flying heights (heights of about 5 km are frequent) make it hard to recognize details; at least they occasionally show linear features, mostly from former pathways.

Example 3: St. Jean (west of Pont-f'-Mousson)
Taken on December 24th, 1916 at 10:45 AM, flight height: ~1.750 m, focal length: 70 cm.
The vertical photograph shows the front-line near the destroyed village of St. Jean. Archaeological features, excluding the combat-marks, are only drains and former pathways as relief.
On the back, next to a stamped "Geheim" (secret), the remark "Gruppe Mitte" (middle group) in pencil, and another stamp with remarks written in by hand:
   Feld-Flieger-Abt. 33 (division)
   Nr: 484 (photograph’s number) Datum: 24.12.16 (date)
   Ort: St Jean, 20 45 Brw. 70cm (locality, time and focal distance)
   Beobachter: Lt. Haller (observer)
While the subject is damaged by numerous shell-craters, the photograph itself has been damaged by moths.
The 3 examples represent the usual spectrum of military aerial photographs from WW I as offered on eBay.
In any case, these pictures are an unparalleled record of the ancient state of old cultivated landscapes. They show areas, already accessible through other archeological sources, more precisely than contemporary maps.
With the help of such pictures one might be able to more precisely classify the one ore other vague contemporary record of finds. I would even say that aerial photographs from WWI are an excellent enrichment of a GIS.
Now such pictures find their buyers from an enormous audience instead of resting unnoticed in the shops of antique dealers. Therefore this is surely a good notice to French colleagues to look for such pictures on eBay Germany.

A comment on younger APs:
I have not yet seen aerial photographs from WW II offered on eBay, postcards from the 1930's and the 1940’s with aerial photographs of single villages can be found more frequently though.
In May 2001, a CD-ROM with current reconnaissance photographs by the German Luftwaffe from the Cosovo was put up for public sale for a short time. The auction was canceled though before bids were made (probably a sign of criminal relevance).
Kite Aerial Photography in Egypt’s Western Desert

Richard Knisely-Marpole

“Kharga Oasis is the largest oasis in Egypt's Western desert. The oasis lies approximately 250 km west of Luxor. It has been a major part of the trade network connecting the Nile Valley to Egypt's other western oases, parts of the Sudan (e.g. Darfur), as well as to Libya. A long section of the Darb el-Arbain (the forty days road) passes through Kharga, the Darb Ain Amur connects Kharga and Dakhla oases, and one of the major tracks to Uweinat and the Gilf Kebir on into Libya originates in Kharga. Historically Kharga has been the source of dates, grain, and wine. From the pharaonic period onward, it has been a traditional place of banishment from the Nile Valley. During the Roman period, Coptic Church fathers were banished there. It thus became a major centre of the Coptic Christian church, and was a bishop’s seat until the end of the fourteenth century. Archaeological remains in the area include prehistoric settlement remains, tumuli, rock-cut tombs, sandstone temples from the Late Period (VI century BC) onward, Roman fortresses (III-IV century AD) with their mud brick walls still standing to fifteen meters in height, and extensive Christian remains. Many of these sites have never been studied at all.” (Ikram & Rossi in prep.)

Kharga remains an area of perceived (if not actual) unrest, with many military checkpoints on the roads. Also, just outside the town of Kharga, is a high security prison which reportedly contains prisoners who are awaiting execution! For this reason, together with the high cost, the use of an aircraft to obtain aerial photographs was out of the question. A helium balloon was considered, but the cost, especially of helium gas, the bulk and the likelihood of objection to its use by the military, ruled out this option also.

Dr Corinna Rossi, joint leader of the project, had learned of the work of Prof Barri Jones in Libya, using a kite to take aerial photographs. She contacted him for a recommendation of someone to carry out this work, and he passed on the request to me. The aim was to obtain oblique aerial images of seven sites, showing them within the surrounding desert landscape.

The kite I use is a sparless aerofoil from Greens Kites of Burnley, which they sell as part of a kite aerial photography kit. Although it’s about 2 metres wide, it packs down to a small size, which makes it ideal for remote locations. The whole thing including camera, mount and radio control will go into a small rucksack.

I decided that, with the recent developments in digital photography, it would be an ideal opportunity to replace the 35mm film camera with a digital. This would have two advantages. The first and most important was that images could be downloaded onto my laptop and viewed immediately after each flight, so I could check whether I had been successful and, if not, could fly again. There would be no waste, as unsuccessful images could simply be deleted. Secondly, I could use a digital camera that was a good deal lighter than the usual 35mm SLR with motor wind, which would be an advantage in light winds. I had never been to Egypt, and imagined that there would be little wind to fly the kite. How wrong could I be!

I chose the Olympus C3030Z camera for several reasons. The camera was small and light; the image quality was superb, allowing A4 size prints indistinguishable from photographic prints;
manual control was available over many of the camera functions, so I could set the camera to shutter priority auto exposure with a shutter speed of a 500th or 800th second and could pre-set the zoom to its widest angle and the focus to infinity. Prudently, I bought two cameras in case of accidents.

Digital cameras are not noted for their robustness, so I set about building a padded cradle, from lightweight alloy and closed-cell foam, which also held the radio control receiver and mechanical linkage for firing the shutter.

I kept the equipment stripped down into several constituent pieces so that its appearance would be less likely to attract the attention of customs in Egypt. This worked, but the amount of equipment I was carrying gave considerable difficulty. Thankfully, Dr Salima Ikram, the other joint leader of the project, had arranged for me to be met at Cairo airport by a representative from American Express and he smoothed the way so that I passed through with only a minor delay. Without his help, it is likely that I would have been held up for hours.

My first attempt at flying the kite, at Ain Gib, was an absolute disaster. Again to reduce bulk, I had made a winder for the kite line resembling the flat hand winders for fishing line that I
used as a child. This was absolutely useless. Far from light winds, there was half a gale blowing at Ain Gib and while the kite and camera were in the air an extra strong gust tore the winder out of my hands. The kite plunged, with the camera smacking into the ground and being dragged for many metres over sand and stones. On recovery, I discovered the camera still working - just. The lens, which telescopes back into the body when switched off, simply wouldn’t return and kept shunting in and out. The only way to turn the camera off was to remove the batteries. To give some protection from sand, I had used the accessory mounting tube with a UV filter on it, but even so there was sand on the inside of the filter, but this had, at least, protected the lens from real damage.

Back at base, a little brute force - by helping the lens to telescope back into the body - cured the fault and the camera worked fine from then on! The problem of controlling the kite line was solved by the purchase of a couple of chair legs. The line could be wound several times round one of these to act as a friction brake. I would hold this and could then control the line quite easily while another member of the team used the radio control unit. The original frame would be used purely for storing the line. There were further bumps and scrapes to the cameras during the expedition, but they continued to work perfectly, I must congratulate Olympus on the build quality.
Being dependant on the wind has major drawbacks. If it is too strong or too weak, then flying is not possible, also the right conditions for flying may not coincide with ideal light conditions. With the exception of a couple of days, for the three weeks that I was in Kharga the wind continued to blow strongly with, on two occasions, sandstorms which obliterated everything. The camera bounced about so much on the kite line that it was impossible to be sure that the camera was pointed in the right direction when the shutter was released, so it was usual to fly more than once to get an acceptable picture. In contrast, on those occasions when

Umm el-Dabadi, enhanced to better show cultivation plots

the wind was light enough for the kite to fly gently, it was possible to get a good image at the first attempt, as shown by the picture of Ain Lebekha.

As well as the advantages mentioned above, using imaging software, typically Photoshop, the images can be manipulated to enhance certain aspects, e.g. the cultivation plots that exist at Umm el-Dabadi. These are virtually invisible on the ground, but show up slightly in the aerial shots. By using the layers feature of Photoshop and manipulating the contrast, it has been possible to show these much more clearly. My decision to go digital proved to be the correct one!

The only change needed to the kap (kite aerial photography) rig is a more sophisticated method of controlling the kite line. I have in mind a friction device based on a bicycle wheel hub, round which the kite line is wound. This will have a braking device which is normally on. The line will simply be held in a bag attached to a belt. I only need to control the release of line, recovering line is not done until the kite is down, so no winding mechanism is
required. I’m not sure yet of exactly how this will be constructed as I am no engineer, so there is still much planning to do.

The work in North Kharga is of particular importance as virtually no published work on the archaeological remains in the area exist. It is also extremely urgent that this work is undertaken soon, as many of these sites are being plundered and destroyed by antiquities thieves, and all the information lost. A further cause for concern are the recent plans of the Egyptian Government of creating a ‘parallel valley’ including Kharga Oasis; this will transform large desert areas into cultivated lands by means of water coming from Lake Nasser and from a better exploitation of the already existing springs and wells. Furthermore, the Ministry of Tourism is trying to encourage desert tourism in Kharga and the Western Desert. This will increase the number of tourists who disturb the archaeological remains and plunder the sites, leading to the loss of vital information concerning the history of Kharga Oasis and its importance as a cross-road between Egypt, Libya, and Sudan.

We plan to return to carry out further survey work in January 2002 if funding can be obtained. During this visit the main purpose will be to carry out a topographical survey of the area around Umm el-Dabadib, and also to take vertical images of several areas to help understand the layout more clearly.
Rosia 2001: no comment
Aerial Archaeology by Remote Controlled Micro Aircraft

Michael Schönherr

1. Introduction
From time to time one can hear about aerial photography made by model-airplanes. Mostly the pictures have poor quality and a lack of composition. For archaeological purposes small airships, captive balloons and kites are sometimes successfully used. Model planes are used less often, because they may require runways, highly qualified pilots, and do not permit mistakes. However, when they work, they should always, and everywhere, provide a cheap means to produce aerial photos from nearly every position and altitude. However, this method is restricted to the site, where the ground limited pilot is staying and if he uses a practical technique without a video-camera, he doesn’t exactly know, what his onboard camera will record.

After some years of ground-limited hobby-archaeology, I found that there was often no advancement without the help of aerial archaeology, but no one would pay the hobby-archaeologist the costs of manned-plane reconnaissance. One or two flights would never be enough. In that time I contacted Otto Braasch, who gave me uncomplicated help, advice and continues to encourage me.

From childhood, I have been interested in anything to do with flying. Later I studied aircraft engineering, flew all kinds of model-planes and hang gliders and developed aerodynamic test-vehicles to study their behaviour and to make them safer. (See: www.net-art.de/mech/aerotest ) Now I saw the chance to combine the flying and archaeological interests as it is true for all aerial archaeologists. In my case it was the challenge of constructing and controlling a cost-effective and silent drone for archaeological missions nearly anywhere.

2. Prospection technique with the micro aircraft, System ‘Stromburg’

The developed reconnaissance-machine is a scaled down tailless wing, type ‘Stromburg’. I presented this concept first in 1986 to the public. Since then it was applied with wingspans from 1 to 6 m and masses from 1 to 20 kg for multiple tasks, since 1989 also with remote activated film/ photo/ video cameras. To minimise risk and for greatest possible simplicity and availability I developed a smallest possible version with only 1.6 m wingspan and 1.5 kg takeoff weight. This ‘flying camera’, can start and land nearly everywhere. The micro-aircraft has a strong electric drive which enables the completely equipped vehicle to climb up in an angle of 45° and to reach the maximum visible altitude in less than 30 seconds. The operation altitude goes from near the ground until the optical limit near 300 m. It is possible to make oblique photos (preferably 45° to the side) as well as vertical ones. The first archaeological mission started July 17th 2000.
The aerial photo shots are activated from a nearly horizontal gliding flight position after the electric drive is stopped. When the camera is vertically positioned, the target is flown over while the camera makes shots at constant intervals. This procedure is repeated several times, each time crossing the target on a different radial flight path. With an oblique-mounted camera the target field is orbited with the camera looking to the inside of the circle, also with shots made in constant intervals. When flying a circle in the opposite turn the landscape outside the target is completely recorded - if wanted until the horizon. Of course also different reconnaissance strategies may be expedient, but the above procedures allow that no optical information will be lost.

The model aircraft carries a piezo-gyro which is essential when flying in gusty conditions or near the sight limit. Angular movements of the plane (and the camera) are immediately self-corrected, the pilot’s stress is reduced and the photo quality improved.

From July 2000 to July 2001 I have taken some 1000 air-photos in about 50 accident-free prospection flights. Plane-construction and photo-techniques were constantly improved. At present a scaled up ‘Flying Camera’, type ‘Stromburg’ with doubled wing area is under construction. This machine will enable photos to be taken up to a 600 m altitude with improved comfort.

3. Silent flight over roofs on archaeological mission

My experience with aerial observations told me that one has to visit an archaeological target many times a year in order to get the chance of finding what you are looking for. Often those targets are in the vicinity of, or between, houses. In other cases you want to document the progress of excavations or make photos of monuments, Roman streets etc. Anyway, there often is a need to fly close to modern settlements. The small model with an electric motor enables this to be done without disturbing the population.

The famous ‘Waldalgesheim princess grave’, found by a farmer while ploughing, was excavated in 1869/70. This dynastic grave revealed most exquisite jewellery and was sponsor of the Celtic "Waldalgesheim - Style" (Jacobsthal). It is an irony of fate, that the location of this celebrity had been lost, no one had noted its co-ordinates. In the last 5 years I made inquiries and found new documents which determined the location to an area of about 100 x 100 m. Within this area, on a small suspicious place, I found parts of a fibula, a half-melted bronze piece and an eye-pin for the chariot, all of it fitting well to the known inventory of the princess- grave. There was still missing a relevant cropmark as final proof. By July 2001 I had taken about 500 air-photos over and in Waldalgesheim. The aim was to find the grave, to exclude other possible locations, and to develop techniques of aerial photography by remote controlled micro aircraft. This campaign ended successfully: at the predicted place the cropmarks of the former grave could be documented and nobody had complained about the weekly flights, takeoffs and landings.

4. Air-photos of monuments and excavation-sites

The archaeological benefit of aerial photos is not limited to crop/groundmarks and prospection. It is also helpful for documenting monuments as well as for recording an excavation status or for mapping. In the ‘Binger Wald’ forest, a giant villa rustica is being excavated. With the camera in vertical position the excavation-status of July 2000 could be documented.
The "lost" Celtic princess grave of Waldalgesheim, excavated 1869/70 could be detected also from the air at the predicted place, between two forking prehistoric routes, which were abandoned in about 1950. Their traces are still visible as bright and straight cropmark-lines. The right route ‘1’ (Erbacher Weg) became part of the first Roman street from Mogontiacum to Augusta Treverorum. 100 m from the other route ‘2’ (Eicherweg) is a La Tène B settlement field. The excavated grave (see arrow) shows circular positive-negative cropmarks with a max. diameter of 13-15 m, which should indicate the former grave mound size. Evidently the grave stood in a geometric relation with the two antique routes. The centre of the grave-position lies exactly on the field-parcel of the 1869 grave-finder, the farmer Peter Heckert

Villa rustica documented during excavation in the 'Binger Wald'
5. Discovering observing and classifying a new archaeological site

At the beginning of a not yet ended ‘thriller’ was an air-photo, one among hundred aerial views of villages and towns in a local exhibition in March 2000. (Thanks to Mr. Reisek!). Near the castle ‘Dhaun’ in the district Bad Kreuznach I discovered on the photo a mighty ring ditch, which was not yet known either to the officials or to the photographing pilots, who had no archaeological intentions. Visiting the locality, I found a hill, extended to some 80 m and about 2-3 m high. Anything was typical for a huge flattened grave mound, whose ring-ditch diameter was evaluated to the dynastic level of up to 50 m!

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Overall view of the air-detected archaeological site: G1: 50 m ring-ditch tumulus, G2: 22 m ring-ditch tumulus, G5: ditch system, sectioning the mountain spur at its smallest location. 300501B30F525077
Because of a big secondary rectangular cropmark, Dr. Zylmann and Mr. Reisek thought, that G1 could also be the rest of a medieval ‘Motte’. Indeed in 1340 the archbishop of Trier ‘Balduin’ came here with his army, besieging the castle of Dhaun. For that he built a counter-castle and surrounded Dhaun with a wall as the chroniclers’ reported. But neither has been found. So I favoured the lonely big tumulus to be perhaps the remains of Balduin’s counter-castle. Then I started the air reconnaissance activities with the ‘flying camera’ and observed the site from May to July 2001 nearly weekly, taking 400 photos in about 20 flights. They revealed real news! First an additional 22 m sized ring-ditch system was found: G2.

The cropmarks of tumulus G2 have all characteristics of a grave-mound: the circular ring-ditch and the central grave-cavity oriented to the east. In addition, from the ground the flattened grave hill, still about 0.7m high, could be seen. If there is a proven grave-mound G2 only 100m away from the huge tumulus G1, it becomes more probable that G1 is a dynastic grave mound erected in the late Hallstatt or early La Tène time. The region here belongs to the centre of Celtic development and expansion in the beginning of La Tène, nowhere else was such a concentration of dynastic graves in that phase of the ‘Hunsrück-Eifel-Kultur’. It should be mentioned, that the cropmarks of G1 were only visible from May 30th till June 13th. What a mishap if I had not made air-photos at that place in those 2 weeks!

Further observation of tumulus G1 revealed circular substructures as seen on the following figure. I’ve never seen such crop-patterns within a grave-mound, although they may indicate secondary graves. On the right side of the picture is part of the double-ditch-system that crosses the mountain-spur at its waist.
The central structure of the big tumulus G1 had also been investigated. A central positive cropmark is surrounded by a rectangular ring with negative cropmarks.

If G1 is a huge dynastic grave-mound, then we see the central grave, touched by the plough. Typically those graves consisted from a wooden chamber, often put up on the antique surface or not much dug in. This chamber was mostly protected from all sides by a big stone-package. When some years after the burial the top of the wooden chamber collapsed, the stones there fell into the chamber space and earth from the grave-mound followed into the hole. So, many centuries later, when the plough reaches the former stone-package, then in its centre there is still humus which may cause positive cropmarks, whereas outside there is a ring of stones scratched by the plough and seen via negative cropmarks. That is what the picture might show. The approximate dimensions would be: Stonepackage, 6.5 to 5.5 m, Chamber: 3.7 to 2.7 m. The longer sides of the rectangles point to the east. Besides the mound-size the grave dimensions would be comparable to the dynastic graves of the Glauberg- and the Hochdorf-mounds, excavated in the last decades. However, we still have no proof, the remains of a small rectangular tower might look the same way. A grave-mound with a later tower erected on it is also not impossible. But why there? All the castles and towers here around are built on rocks, of which there are none near the tumuli.
Another important surveying result was the detection of a linear double ditch-system, crossing the whole mountain-spur at its waist (G5). What could that be? It seems too wide to be an abandoned way. Also the historic maps (Tranchot 1812, Map No. 209) show nothing along the cropmarked-line, whereas the way is plotted nearby, just where it is today (see next photo). Is it then a prehistoric earthwork? Is it Archbishop Balduin’s siege-wall of the Dhaun-feud of 1340?

It is interesting, that the nearby castle of Dhaun was formerly called ‘Dunum’, ‘Castrum de Dune’, sometimes ‘Thaun’, which is spoken like the English ‘town’. All of the terms have the common late-Celtic origin ‘dun’ which means ‘fortified place’. These days the late-Celtic past of Dhaun castle has been proven additionally by findings on the castle-plateau (Nortmann). Is it too daring to suggest that the earlier lords of Dhaun were buried in the big tumuli? Anyway, the prehistoric times and the Middle Ages have left their traces as an outstanding archaeological site that vegetation and aerial photography have brought to light.

The cropmarks of a linear ditch -system going from the left upper corner to the right lower corner. The big tumulus is still visible to the left. 230601B18A

6. Conclusions

It has been demonstrated, that aerial photography and archaeological reconnaissance by remote-controlled micro-aircraft is feasible and helpful. They can be favourably applied to ‘all day’ observation of sites and small areas, especially when their archaeological relevance is known (because of finds, prospection from manned aircraft, etc.) or just following the ‘seventh sense’ of the inquirer. It is an effective, low-cost, method when a skilled pilot controls a reliable and crash-tolerant ‘Flying Camera’, which can be landed almost everywhere.

Please note, that all the air-photos used in this contribution were taken from my remote controlled micro-aircraft and are copyright of the author.
“The site was discovered on an aerial photograph.”

Thoughts on the ‘when’ of discovery

Rog Palmer

The first sentence in my title infuriates some aerial photographers but, as an interpreter, I know there are many times when it is true. Some aerial photographers promote the myth that their airborne eyes are infallible. Anyone who examines aerial photographs in detail, even those taken by themself, knows this to be incorrect. A moving airborne observer does not have the time to perceive, analyse and understand all the detail that may be visible in each modern field. In addition, their mental ability to link together bits of information seen in nearby fields may be sketchily optimistic and they only have the possibilities of seeing what features may be visible at the time they are over that location. The fliers’ questions – and their interests – differ from those of the interpreters and their site descriptions tend to be of basic and easily classifiable forms (eg ‘henge’), or puzzling features (‘intriguing crop mark’), or unclassified (‘crop mark’). Comments made by Jim Pickering (1994) tend to confirm this. Just as there are levels of interpretation – eg for mapping at 1:10000 or 1:2500 scale – so also are there levels of discovery which range from ‘it is at x’ to ‘it is an x’. The following thoughts may serve to open a bit of discussion about when a site is actually ‘discovered’ – if such things matter to most of us!

The aerial photographer, flying to take oblique photographs, may be the first to identify as archaeological some bumps, coloured soil or differently growing crops and then to record them on film. This is a fairly elementary level of discovery, perhaps equivalent to Columbus (or Vikings or mesolithic Russians) finding a chunk of land. They found it, they know it is there, they have a superficial record of what it looked like from their viewpoint and, if we’re lucky, they can tell us its exact location.

The aerial photographs recording that discovery may eventually end up in a library with, at minimum, a locational reference. The old CUCAP card index went one step further and included a subject category – ranging in depth from identification of known sites (eg Stonehenge), to distinctive forms (eg causewayed enclosure, Roman camp), and the vague ‘crop marks’. This, I suggest, attaches a higher level of discovery – perhaps the beginning of understanding – to that record by linking the photographer’s description of what the main features on the photograph may be to its picture. In the case of CUCAP photographs, this record was compiled by the photographer (St Joseph or David Wilson) but in a broader-sourced library, such as England’s NMRAP, there is no linked (or convenient) thought or description from the photographer. Thus any person examining that photograph begins with no knowledge of why it was taken other than the basic premise that it is likely to record something thought to be archaeological.

There can be no dispute that an interpreter holds intellectual copyright of any analytical drawings or plans derived from any air photos. What may be more contentious is to suggest that such work also announces their ‘discovery’ of what is on those photographs. The aerial photographers are the initial data collectors; the interpreters refine and clarify those data but, in their own way, are still collecting it. This reflects the process of aerial survey as it is undertaken for archaeology in Britain and Europe. The data become ‘archaeological’ only after thought, analysis, and description link them with other sources of information. There
have been no claims that I know of by interpreters to be the first to ‘discover’ anything, even though this may be a daily occurrence. Results of interpretation are likely to be much more archaeologically informative than any collection of photographs and may range from identification of an internal circle of pits within a ring ditch to Derrick Riley’s expanse of brickwork fields (Riley 1980). The first was discovered on one of my photographs during the first week that a student, Lidka Zuk, was working with me; the second was a product of Riley’s own planning, photography, interpretation and mapping that was conducted over a ten-year period.

It follows that the correct version of my title ought to be ‘The site was interpreted from an aerial photograph’ but my main point, I suppose, is to ask whether it matters one little bit who saw something first? Perhaps it does … but only to that single person. Any comments?

References


Riley, D N, 1980. Early Landscape from the Air. Collis, Sheffield.
Books of interest?

Archaeology Southwest

No, not Cornwall, but Arizona. Kevin Jones sent me a couple of issues of this well-produced and colourful newsletter because they include a selection of aerial photographs by Adriel Heisey. The photos are mostly of known and upstanding sites and are enhanced by the late evening (or early morning) light that microlight pilots prefer. Heisey’s photos can also be seen on web sites (a search for Adriel Heisey listed more than 120 sites – mostly the same one!) and in his book Under The Sun: A Sonoran Desert Odyssey (Rio Nuevo Publishers, Tucson, Arizona. ISBN: 0-9700750-0-6. $40.00).

Archaeology Southwest is published quarterly by the Center for Desert Archaeology, 3975 North Tucson Boulevard, Tucson, AZ 85716, USA. Membership rates range from $10 (individual) to $500 (patron) and entitle members to discounts on other Center publications, lectures, site tours, etc.


Another edition of Bob’s standard lecture about NMP which, we are promised, is to introduce a series of articles dealing with specific landscapes. It will be good to see papers resulting from NMP and I hope that the format of the journal – somewhere between A5 and A4 allows maps to be shown of large enough extents and with sufficient detail to aid the discussion.


This paper describes some of the processed involved in a project that has mapped 23000 sq m of the Roman town of Teurnia and which allowed 150 years of excavation to be given some context. Use of a photogrammetric technique, bundle adjustment, to allow accurate mapping of single oblique photographs using Softplotter software. Transformed photographs were then imported into ERDAS Imagine GIS where interpretation was carried out on-screen to produce vector drawings. Some of the most informative photographs were made by S Tichy, who is not an archaeologist, but made several flights in the area of Teurnia with a 35mm camera. The photographs are good quality but many lack good control points and required use of tie points to enable their transformation. Aerial photographers cannot escape the fact that their photographed information is, or is likely to be, required to make maps and Michael Doneus ends his paper with a plea:

‘However, the author wants to stress that providing good control information on aerial photographs should be a concern of the archaeological aerial photographer. Even if modern hard- and software may make it possible to correct for a certain degree of neglect, the expenditure of time and money is still high compared with a little responsible thought (and action) while in the air.’

Elegantly put, Michael.

Some CBA Research Reports are accessible free of charge in PDF format on the Archaeology Data Service web page. I’ve not checked to see if these include the two aerial publications (CBA RR 12 and 49). http://ads.ahds.ac.uk/catalogue.resources.html?rr

There are a few of copies left of two of the last Cambridge Air Survey books:

Britain's Changing Environment

and

Natural Landscapes of Britain

These are worth buying just for the pictures (did I write that?). Natural Landscapes is extremely useful for anyone working in Britain or in a country with similar landforms.

Bargain offers at £5.00 each, or £10.00 each including UK postage. Please contact the library staff at CUCAP: 01223 334578 or aerial-photography@lists.cam.ac.uk

[All comments this issue by Rog Palmer]
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