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For some reason the printer
machine refused to print this issue
at the correct size so it's been
made using ancient technology.

"we are not amused by your
open's closing remark" (p.71)

20.9.03
Editorial

Time
Compilation of this issue has been more rushed than usual due to a flood of ‘urgent’ developer-funded work following, or anticipating by a day or two, the harvest. After some twelve months of relative inactivity and approaching poverty, this work had to take precedence over you lot. Apologies in advance for any cockups in this issue.

Archives and indexes
With tongue slightly in cheek I mention that one of work’s great pleasures is to find a user-friendly and accurate computer index of aerial photos that offers free access to one of our major collections. Try it for yourself at: www-arcims.geog.cam.ac.uk/website/front.html and please send comments – as requested – to the management. They may or may not act on them….

Training school at Foggia
Chris Musson and Cathy Stoertz have written the almost-official report on the fourth training week in Europe. For me there were two considerable advances over previous schools: use of local pilots meant that students had to take charge of their own flights rather than be chauffeured from site to site as before, and Michael Doneus was using a digital SLR which gave the ground school immediate access to photos taken during the course. The ‘beginner’ students were generally a happy and hard-working bunch (for Italians!) and made good inroads into beginning photo interpretation and pisellometria. AirPhoto 3 (due for release fairly soon) was given a severe bashing by them and they managed to cause several crashes to it that I’ve not be able to reproduce since I got home. In the evenings we tutors were abandoned by the students who sought out real Italian food, claiming that the food at the hotel was tourist quality.

And the flying? Foggia is almost too-good a place to begin as there is no chance of learning hunting skills. Features on the ground are as dense as in the Fenland and much of the photography became selective rather than aiming for total cover of small patches. The only way to record an area with that much information visible is by block vertical photography. Even Otto agreed, although I bet that doesn’t stop him going back again.

Some Foggia students, tutors and diplomas.

Foggia mishmash: neolithic enclosure, Roman centuriation with vines and olives. Taken on finals. (Nikon Coolpix: 25 May 2003)

Digital SLRs
The digital files from Michael’s DSLR (Fuji FinePix S2) that we used for interpretation were as good as was necessary. With Otto now also using a DSLR along with his analogue cameras and me on the verge of getting one it is perhaps time to put together the assorted email chat that has been going on and get down to some serious discussion. Next issue perhaps?
Clay
I am very pleased to have persuaded Jess Mills to summarise her undergraduate dissertation in a paper for this issue. Really it needs wider reading and my next task is to get her to submit it elsewhere… but meanwhile she has an (unrelated) PhD to deal with. In Britain it seems to have been Jim Pickering and Glenn Foard who pioneered work on the clay. I’m more familiar with Glenn’s photos, having done occasional work in Northamptonshire and he seems to have made a point of reserving some of his annual flying budget to examine the clay on dates when crops on it may be productive. However, I think that Glenn, like the rest of us (or am I wrong?) have lumped together all clays as ‘clay’. Jess’s work suggests that this is wrong and shows that different types of clay produce different amounts of information. Possibly it has needed some twenty years of flying to be able to reach this stage although much of her data comes from photographs taken on a single day. As usual we need more data and this is likely to come only if we have another drought year and have not spent all our flying money on the easier soils. Clay soils seem to produce their crop marks late in the growing season so it may be necessary to nail all aerial photographers to the ground until mid-July if we ever again have a potentially good season.

Euro-AARG
This issue includes a surprisingly high number of contributions from beyond Britain and begins to show just how much work is going on across (at least) Europe. By ‘work’ I don’t mean just aerial photography as a source of illustrations, but its use as an archaeological tool. In Poland, Wlodek continues his battle with traditional archaeologists as reported in a conference review by Lidka Zuk, there is news of an exhibition in Slovenia, in Armenia we’ve finally got an archaeologist – unfortunately not one of theirs – into the air, in Foggia we got hoards of students involved in flying, photography and interpretation, and Gwil Owen tells us about aerial photography and wheelbarrows in Egypt.

AARG 2004
All this leads towards AARG 2004 which will be in Munich. Toby writes more about this but I’ll use this space to remind UK members that it probably costs less to fly to Munich than it does to train or drive to Winchester (last time I looked a single from Stansted was about £11). We’ve juggled dates to avoid the Oktoberfest (sorry Davy) and to keep Otto happy by avoiding the EAA meeting (when they finally told us their dates…) so we hope for a good turn out of members from all countries.

List of members
We had hoped to include a list of members in this issue and Kenny Brophy sent me this as (almost) his last act as Secretary. Glancing through it, I noticed quite a lot of incorrect addresses, in particular email addresses, that I’ve not got time to change. I’ll leave its publication for a future date in a thin issue of AARGnews. Sorry Kenny!

More from Foggia:

Advanced group and their jumble of technology. Everything was done on-screen.

Pete Horne using OHP to demonstrate the network method to the beginner group.
Chairman’s Piece

Toby Driver

In Wales I remain ever hopeful of a good cropmark season and this year came closer than ever to a repeat of the drought conditions which prevailed during 1995-1996, albeit eventually spoiled by one too many rain storms. I took over the flying in Wales in 1997 following three very good, or exceptional, dry summers and I did not know then that I would be starting on a six year lean period, enlivened by 2 week dry spells with good parchmarks in grass, but otherwise characterised by long receee trips in the Cessna 172 from Haverfordwest in the southwest, or Shobdon/Welshpool in the east, gazing down on miles of unresponsive arable.

The standard ‘May-October rainfall’ map found in good atlases of Europe, and sometimes used by lecturing aerial archaeologists in warmer climes to show the drought potential of their region, lists the bulk of Wales as having more than 500m (20 inches) of rainfall in the period, putting it up there with western Ireland and Scotland, the Pyrenees and the odd damp pocket of France and Germany. Cropmarks in Cymru are an occasional phenomenon rather than an annual occurrence and I have got used to enjoying the guaranteed discoveries which winter reconnaissance in the Welsh hills brings (see lower Chairman’s photo, AARGnews Number 26). On a crisp winter’s day with clear sunshine, looking out of the aircraft window over uncultivated hills, one is sure to see virtually any impact made by the hand of man from prehistory onwards. In summer, flying conditions are far more pleasant, but Welsh cropmarks can be rather shy beasts that come forward if the weather during the growing season has been just right, only to disappear at the slightest hint of rain. The summer of 2003 has seen fragmented, regional returns from cropmark reconnaissance but in parts of west Wales and the north, there have been some really rewarding discoveries. I calculate that if current predictions for global warming are correct, Wales may possess a climate not unlike that of the Foggia Plain in Italy in 20 years time. According to a recent BBC news story (http://news.bbc.co.uk/1/hi/wales/mid/3013468.stm), climate change is being heralded by warm-water loving spider crabs invading Cardigan Bay off the west coast of Wales, so there is still hope for future cropmark seasons.

On more serious matters, AARG is looking forward to its first European annual conference in some years. ‘Aerial Archaeology – European Advances’ has been planned over 4 days between 5th-8th September 2004 in Munich, Germany (see announcement elsewhere in AARGnews). It has been designed to run just before the Lyon meeting of the European Association of Archaeologists, and those delegates who wish to do both should be able to skip the AARG fieldtrip on the 8th and catch a plane or train to France. Dr. Jörg Fassbinder and his colleagues from the Bayerisches Landesamt für Denkmalpflege have offered their considerable expertise with the organisation and it should be a very successful international meeting. AARG is hoping to circulate a ‘call for papers’ during the Autumn 2003, and we hope that factors which might prevent European (and worldwide) colleagues from travelling to the rather expensive Euro-free zone of Britain, will find it far easier to travel to Munich and share their aerial archaeology experiences with a wider audience.

The AARG committee has been kept busy (as ever) during the spring and early summer. Closer links are being established with the European Archaeological Council who are seeking guidance on matters relating to European aerial archaeology. AARG’s interim statement which was submitted to the EAC is reproduced in full in this AARGnews, but I hope that this can be a relationship which is continued, and strengthened, with the formation of an AARG European Working Party for Aerial Survey. The maintenance of the Research Group at the heart of these matters, and not on the periphery of new developments, is, I believe, imperative for its future success and growth.
Chairman’s discoveries:

Romano-British (RB) settlement at Penparc, near Cardigan, west Wales. On the coastal plain between Aberporth and Cardigan, over a distance of some 6 miles (10kms), concentric prehistoric, and square RB, enclosures predominate. Reconnaissance during July 2003 discovered three more RB enclosures, and several prehistoric settlements. As a rule, cropmark discoveries in Wales tend to comprise discrete enclosures and sites, rather than the ‘continuous landscapes’ of other parts of Europe. (2003-cs-1453, 14th July 2003, Crown Copyright RCAHMW)

An unexpected discovery in the parched grass of a golf course at Degannwy in north Wales was this system of First World War practice trenches, whose scale can be judged by comparison with the houses at the bottom of the frame. Occasional upstanding systems of practice trenches are known from other sites on the coastline of Wales and two examples are scheduled as ancient monuments. (2003-cs-1519, 15th July 2003, Crown Copyright RCAHMW)
‘Aerial Archaeology – European Advances’
A decade on from Kleinmachten

International aerial archaeology conference, Munich, Germany,
Sunday 5th – Wednesday 8th September 2004

Bayerisches Landesamt für Denkmalpflege, München, Deutschland -
Bavarian State Department for Historical Monuments, Munich, Germany

In September 1994 the historic Symposium zur Luftbildarchäologie in Ostritteleuropa, ‘Aerial Archaeology in Central and Eastern Europe’, was held at Kleinmachten, Brandenburg, drawing together aerial archaeology and remote sensing practitioners from across Europe following the fall of the Iron Curtain. Ten years on, the Munich conference will celebrate and investigate the progress of aerial and ground remote sensing in Europe and surrounding countries, addressing a number of key academic, technical, management, survey and archive issues over two main conference days.

Sunday 5th September. Official opening and reception

- Evening reception for delegates & poster viewing.
- Official opening and keynote address.

Monday 6th September. Conference day 1

Revealing Neolithic Europe

- The contribution of aerial reconnaissance and remote sensing to an understanding of the Neolithic landscapes of Europe. In association with the Neolithic Studies Group. Papers to be published in monograph. Organisers: Dr Kenneth Brophy & Dr Gordon Barclay

Tuesday 7th September. Conference day 2

Aerial Archaeology and Remote Sensing – European Advances

- Session 1. Opening European skies – new projects and perspectives.
- Session 3. Combining methodologies – applications of air and ground prospection.
- Speakers to submit abstracts and illustrations for publication on AARG website.

Wednesday 8th September. Conference day 3

Field visit to Bavarian archaeological monuments.

Sunday 12th September. Monuments Day

Tag des offenen Denkmals – European Heritage Days

- Open day for the public – presentation of posters from conference.

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One of the leading personalities and founders of aerial archaeology in former Czechoslovakia Miroslav Bálek died aged 57 in June 2003. He was seriously ill since August last year and although he was fighting against the illness’ progress with brave heart, he finally lost his battle just a couple of weeks after intensively planning training flights with his university students. His death is a painful event not only from the viewpoint of Czech and Moravian archaeology but also from the perspective of air survey continuation in Moravia. For all those who had been in friendly relationships with Miroslav his death is a personal loss.

M. Bálek, a university educated surveyor, and archaeologist by practical long-term training started his air survey career in the mid-1980s and was the first specialist of the former soviet-block countries who was invited to co-operate with Otto Braasch. Together with J. Kovárník he had aimed his attention at both aerial reconnaissance and the study of vertical photographs from archives. From the beginning of the 1990s his air survey activity increased rapidly and he successfully identified many categories of sites and features unknown in Moravia until then. Most important are prehistoric burial sites (ring ditches), Roman marching camps and deserted medieval villages and moated sites. Most of the cropmark features, such as enclosures, were immediately ground-surveyed and geo-referenced by himself, a number of them were investigated using geophysics, and some were also tested by excavation. He published the results of his air surveys in journals in the Czech republic and occasionally also abroad. Since the mid-1990s he had been teaching – as the first in his country – aerial archaeology as a university course at Masaryk University, Brno.

His contribution to the development of aerial archaeology in Central Europe is indisputable and cannot be forgotten. Hopefully he will be succeeded by some of his students similarly enthusiastic as Miroslav used to be.

Martin Gojda

M. Bálek (left), St Joseph, O. Braasch and M. Minařík (pilot) at the Brno airfield in June 1992.
Aerial Archaeology Research School – Foggia, 2003

Chris Musson and Cathy Stoertz

At the end of May 2003, building on the success of our experience in Siena in 2001, AARG’s occasional international teaching team mounted a second Italian research and training school. This year’s course was organised in partnership with the University of Foggia, in southern Italy, and supported in about equal measure by funds from Italian sources and by British funding from the Association for Cultural Exchange, the Aurelius Trust, the British Academy, English Heritage, AARG and others.

Students, staff and summary of activities

Twelve students and researchers from universities across Italy, who were new to aerial survey, and 6 ‘advanced’ students from the Siena school of 2001 joined 12 visiting tutors and 3 local pilots in a programme of ground-based and aerial instruction and research. In the case of the 6 advanced students there was a particularly strong research element, involving the examination of specific topics within one of the University’s special research areas in the Celone Valley just west of Foggia.

After a formal opening ceremony and introductory lectures at the University, the ‘new’ students spent half of each day on flying activities and the other half on ground-based instruction and practical experience. The advanced group had their own programme of activities in the air, on the ground and in the field. The School concluded with a final session involving a presentation by the ‘advanced’ students and an assessment of the results achieved.

Compared with the Siena school, where all three aircraft and pilots were brought from outside Italy, an important development at Foggia was the creation of an active co-operation with pilots and officials of the local Aero Club, so that staff and researchers from the University should have a much greater chance of continuing active aerial survey long after the visiting tutors have departed. It is also hoped that contact between the Foggia pilots and those of other aero clubs throughout Italy will increase the opportunities for fledgling aerial archaeologists to take to the air in other regions.

The Tavoliere from the air

Foggia lies at the heart of the Tavoliere delle Puglie, the dry plain on the ‘heel’ of Italy where John Bradford and Peter Williams-Hunt made such stunning discoveries in the final days of the Second World War. The remarkable character of the Tavoliere’s ‘aerial landscape’ was reflected in the look of amazement on the faces of both students and air-hardened tutors when returning from their first flights over Neolithic villages and later enclosures jostling one another in field after field, beneath overlying cemeteries, Roman villas, centuriation, olive groves and vineyards often stretching far into the distance.

In a ‘continuous’ landscape of this kind it is almost irrelevant to talk about individual sites but in nearly 80 hours of flying practice by the students over 3000 photographs taken from nearly 1000 separate locations, recording at least 100 Neolithic enclosures, 50 Roman villas, numerous cemeteries and kilometre after kilometre of Roman rural landscape. The
photographs and related flight records will form the basis of an incomparable research archive in the University of Foggia, to be enriched in future years by further flying.

**Air photo interpretation and mapping**
In such a landscape the importance of air photo interpretation, and the case for comprehensive mapping of the results, hardly needs making. Instruction in the basic theory and practice of archaeological air survey, and especially in interpretation and mapping, has always been a key element in AARG’s training schools, given equal weight in each day’s activities alongside the flying practice. At the Ground School in Foggia the ‘new’ students learned the elements of photo-interpretation, transformation and mapping. The advanced group focused on particular questions relating to Roman and Bronze Age settlement in the Celone Valley, just west of Foggia. To do this they made use of targeted air photography, photo-interpretation, mapping and (here for the first time) through examination of the evidence on the ground.

**Statistics**
*Flying* – 2 planes (one from Foggia Aero Club) and a pool of 5 pilots, including 3 from Foggia Aero Club.
80 flights = 75.4 hours in the air; 7500 nautical miles; 987 locations photographed.
*Photography* – 111 films = 3612 frames; negatives end to end = 130 metres of film.

**Organisers and tutors**
Thanks to the course organisers: Chris Musson, Otto Braasch and Bob Bewley, and especially Prof Giuliano Volpe and the staff of the University of Foggia.

Special thanks to Roberto Goffredo and Valentino Romano for on-the-spot logistical support of all kinds – running errands, liaison with the hotel, taxi service...

*Tutors* from Great Britain (England, Wales, Scotland, mid-Atlantic), Austria, Slovenia, Germany, Italy –
*Ground School tutors*: Rog Palmer, Pete Horne, Helen Winton, Cinzia Bacilieri, Cathy Stoertz.
*Aero Club Logistics and Film Monitors*: Damian Grady, Francesca Radcliffe, Pete Horne, Chris Musson.
*Flying/Photo School tutors*: Otto Braasch, Bob Bewley, Chris Musson.
*Advanced Group tutors*: Darja Grosman, Michael Doneus.

**Tutors’ Awards and Special Commendations**
It has become traditional in AARG’s international schools for the tutors to award a few special prizes to celebrate the idiosyncrasies and characters of the course.

The “Sink or Swim” Prize – Valentino Romano, who had 2 short flights and then 3 hours with Otto!

Most Effective Teams (for flight reports and working together) –
*Group A*: Betta Garau and Francesco Pericci
*Group B*: Richard Chidichimo and Francesco Rossi
Special Commendation for Perseverance and Overcoming Fears and Other Adversity – Giovani Amorese and Maria Corsi

Funniest Flight Report – Giacomo Disantarosa
Exemplary Flight Report (at the end of the course) – Giacomo Disantarosa

Damian’s Aero Club Awards:
   Funniest Team – Danilo Gallo and Caterina Cittadini
   Most Troublesome Team – Barbara Sanna and Alex Russell (winners of the “Admonitory Finger of Damian”)
   Worst Timekeeping – the entire Advanced Group

Most Courageous Use of the Italian Language – Helen Winton (for her first lecture in Italian)

Most Continuous Use of the Italian Language – All of the Students!

Special Commendation for Translation in Difficult Circumstances (for translating Chris Musson’s somewhat idiosyncratic English) – Francesca Radcliffe

Extra Special Commendation for Translation in All Circumstances – Cinzia Bacilieri

But, despite the above special notices, the highest commendation goes to everybody, staff and students alike. For many reasons, this was our most successful course yet. The teaching team, on it fourth outing, now works together like a well-oiled machine. For the first time, thanks to a lot of effort and advance preparation, we had local photographs to use as examples for interpretation and discussion. And, for the first time, we had the technological capability to transform photos and begin to compile landscape pictures. But of course, the students were the greatest reason for the week’s success – their enthusiasm, perseverance and eagerness to learn made teaching a real joy. All of the students achieved a high degree of success despite the inevitable technical hitches, and their obvious progress, coupled with a strong sense of support from the local university staff, bodes very well for the future of aerial archaeology in the region.

As predicted by Toby in AARGnews 25. Use of anaglyphs for easy 3D viewing.

Advanced group students field-checking one of their sites. They did not expect to see crop marks from the ground.
Aerial Archaeology on Clay Geologies

Jessica L. Mills

Introduction
This paper aims to reassess the problematic relationship between aerial archaeology and clay geologies. For many years clay formations have been seen as areas of ‘low potential’ for the practice of aerial archaeology and this has inevitably had a great impact upon the known distributions of archaeological cropmarks. However, is clay genuinely poor for aerial archaeology? Are all clays the same, or are some better than others when it comes to revealing cropmarks? With clays forming a significant proportion of geological formations within Britain, getting to grips with old biases regarding these geologies needs to be undertaken.

In answering the questions posed above, reference will be made to aerial photographic interpretation work undertaken in the south-east Midlands (Mills 2002). The case study in question (Figs. 1-2) concerns prehistoric settlement and land-use of a 90 square kilometre study area within the clay environs of the Great Ouse and Ivel valleys, Bedfordshire (TL 50802470). This area contains the very eastern limit of Bedford (TL 50502495), the county town of Bedfordshire which lies on the river Great Ouse, and the market town of Sandy (TL 51742494) in the east. The study area is predominantly rural, supporting cereal production and market gardens. Due to the high percentage of land under the plough, (there is little woodland, and limited pasture), the potential for archaeological cropmarks is good.

This paper will demonstrate how clay geologies are not always as unfruitful as they first appear, and secondly, that significant variation in cropmark distributions between differing clay geologies is an important phenomenon that needs more consideration.

Figure 1: Study area
The Present State of Clay

Clay geologies have not had a good press within aerial archaeology circles and this is not surprising. With low success rates in identifying archaeological cropmarks upon such geologies, it is not unexpected that aerial reconnaissance has focused upon the bountiful river valley gravels. With financial pressures, and target-driven projects, the obligation to photograph more sites is great, leading to ‘easier’ areas of the landscape being saturated with aerial photographs. This has unfortunately left great swathes of the landscape with (in many cases) negligible aerial photographic cover. This helps to reinforce the myth that geologies such as clays are not financially and temporally worth pursuing.
Figure 3: Geology and archaeological crop-marked sites.
Nevertheless, this is not always the case. With many counties commissioning geographically unbiased vertical aerial surveys at five or ten year intervals, the chance to help understand the conundrum of clay has been made easier. In the case of Bedfordshire, its unprecedented commissioning of six-yearly vertical surveys has enabled an important picture to be built up of the whole county regarding archaeological cropmarks. Indeed, research conducted within the case study area examined the 1996 vertical survey as well as all the CUCAP obliques held within the Bedfordshire SMR. Significantly, the 1996 vertical photographs were unsurpassed in revealing clayland archaeological cropmarks. This set of photographs was taken almost entirely in one day (18 July 1996) during a particularly dry summer. On that date, crop-marked ditches of hundreds of previously unknown clayland sites were visible.

Prior to this 1996 survey of Bedfordshire, the clayland distribution of archaeological sites was deemed sporadic and small-scale (Simeco 1973: 14). Previous research on the prehistoric archaeology of the area remarked upon the numerous and extensive cropmark complexes on the valley gravels and lack of similar evidence for the large areas of clay formations (Field 1973; Green 1973; Woodward 1978). Even more recent syntheses of the area have highlighted the low number of cropmarks upon the boulder clays in the middle and north of the county (Dawson 2000: 119; Malim 2000: 82).

**Study Area Geology and Pedology**

The geology of the study area (Fig. 3) comprises drift deposits of alluvium, river and glacial gravels along the floodplains and river terraces (Green 2000: 9-11). These superficial deposits, laid down during the Quaternary period, provide calcareous gley soils of the Mead association, which are generally fertile, well-drained soils used for both cultivation and pasture.

Outside the river valleys, the most widely occurring sub-drift deposit is the Jurassic Oxford clay (Edmonds & Dinham 1965: 11). Within the study area it is greatly concealed by glacial and river deposits such as Boulder clay and gravels. This calcareous drift is not wholly impermeable and is found in large zones to the north and south. The parent material gives rise to calcareous gley soils of the Hanslope association, which are classed as being imperfect-poorly drained. Notably, there are significant drift-free tracts of Jurassic Oxford clay in the east of the study area between Sandy and Tempsford, and in the south between Hatch and Sheerhatch. The Oxford clay, a very heavy dark brown formation, is virtually impermeable and of low value for ground water supplies (Edmonds & Dinham 1965: 79; Rigg 1916: 395). Its soils are of a non-calcareous gley soil with imperfect to poor drainage.

A small area of Cretaceous Lower Greensand at Sandy falls within the area and is part of the significant relief-forming Greensand Ridge which runs from Linslade to Sandy, through north-east Cambridgeshire onwards to Norfolk (Chatwin 1937: 19). This sandstone is an important aquifer with springs and wells punctuating its length. Soils are generally brown earth with free to imperfect drainage.

**Survey Results**

In total, 301 archaeological cropmarked sites were noted for the 90 square kilometre study area (Table 1). Observing the geological location of archaeological cropmarks, a number of
general trends has been revealed. It should be noted that many of the negative zones within the study area are due to modern development (compare Figs 2 and 3).

Boulder and Oxford clays within the study area contain fewer sites than may be expected. Despite the large areas covered by these formations within the study area, only 61 sites were located on the Boulder clay, and 33 on the Oxford clay formations. This result is unsurprising because of the abundance of targeted oblique aerial photographs that centre on the productive river gravels. Importantly, the proportion of crops responsive to cropmarks at the time of photography was more or less equal between both clay types.

<table>
<thead>
<tr>
<th>Clay Type</th>
<th>No. of Observed Sites</th>
<th>% of Total Study Area</th>
<th>No. of Expected Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulder Clay</td>
<td>61</td>
<td>36.15</td>
<td>109</td>
</tr>
<tr>
<td>Oxford Clay</td>
<td>33</td>
<td>21.86</td>
<td>66</td>
</tr>
<tr>
<td>Glacial Gravels</td>
<td>3</td>
<td>1.75</td>
<td>5</td>
</tr>
<tr>
<td>River Gravels</td>
<td>159</td>
<td>28.78</td>
<td>87</td>
</tr>
<tr>
<td>Alluvium</td>
<td>45</td>
<td>10.79</td>
<td>32</td>
</tr>
<tr>
<td>Lower Greensand</td>
<td>0</td>
<td>0.67</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>301</strong></td>
<td><strong>100</strong></td>
<td><strong>301</strong></td>
</tr>
</tbody>
</table>

Table 1: Observed and expected numbers of sites within the study area.

However, what is surprising is that the Oxford clay formations contain half the number of expected sites, and significant tracts of this geology contain no cropmarked sites at all. This phenomenon is witnessed on the Oxford clay plain between Sandy and Tempsford, north and south of Moggerhanger, and north-west of Great Barford. From the archaeological cropmark plot (Fig. 3), one can see that cropmarks on the Boulder clays occur in a fairly widespread manner, and large areas where they do not occur are attributable to modern development. In contrast, many of the cropmarks on the Oxford clays hug the boundaries between the river gravels and the clay. Moreover, there are significant areas of Oxford clay that do not reveal archaeological cropmarks and these areas today are open, agricultural prairies.

So what does this patterning suggest? The cropmark phenomenon on the Oxford clays needs further consideration. Could the low number of cropmarks, cropmark-free areas and cropmark locations indicate that the Oxford clay was deemed too heavy and waterlogged for settlement in prehistory? Alternatively, perhaps these areas were being settled and utilised within prehistory however due to geological conditions such activity is not being revealed on aerial photographs? Indeed, activity on the Oxford clay may have left little trace upon the ground. These questions will be considered in more detail below, and potential explanations for the low cropmark occurrence on Oxford clays will be put forward.
Considering the more productive geologies within the study area, the river gravels contain the most significant number of sites. These deposits form the low-lying floodplains and terraces of the rivers Great Ouse and Ivel and are well-drained, fertile areas. The river gravels in particular contain a large number of varied site types; blank areas within this geology are mostly attributable to modern development and quarrying. Finally, the area of Lower Greensand within the study area is very small, and not surprisingly, no sites have been located on this modest section of the formation.

**Clay Geologies**

We can see that the traditional view that clay formations are fruitless for revealing archaeological cropmarks is erroneous. Indeed, with geographically unbiased aerial surveys undertaken over the whole of the county every six years, coupled with the deeper ploughing of the claylands, have disclosed an ever-increasing pattern of archaeological cropmarks within these areas (Clark & Dawson 1995: 62).

Importantly, however, there appears to be a difference between Boulder clay and Oxford clay formations in promoting crop growth above archaeological features. Previously, aerial archaeologists have treated all clays as being less favourable for revealing cropmarks, nevertheless, this research has shown that this may not be the case. The 1996 vertical survey photographs used for this research were taken towards the end of an extremely dry summer. This has revealed many unknown sites on the Boulder clays, but this phenomenon has not occurred to the same degree for the Oxford clay formations - this is also witnessed at Marston Vale, a large expanse of Oxford clay in mid-west Bedfordshire (Shotliff & Crick 1999: 32).

The physical composition of both clays and their overlying soils may hold the answer. The glacially-deposited Boulder clay of the study area is characterised as a stiff grey clay, largely derived from Jurassic clays and Gault, and containing varying amounts of subangular flints, pebbles and rounded chalk fragments (King 1969: 6). In contrast, the Oxford clays of the region comprise very finely grained and pure clay with greater impermeability than the boulder clays (Edmonds & Dinham 1965: 79; Rigg 1916: 395). Is it this difference between compositions that may have given rise to the possible scenarios below?

Firstly, the lack of cropmarks on the Oxford clays may be attributable to the very unresponsive nature of such clays to aerial survey (they are also unresponsive to geophysical survey, J. Taylor pers. comm.). The Oxford clays within the study area are very finely grained, pure and more prone to waterlogging than the Boulder clays. Therefore, if these areas were witness to archaeological activity, the geological properties of the clay may be masking this from aerial photographs. Certainly excess water in clay-based soils may lead to a lack of oxygen in the rooting zone suppressing plant growth (Jones & Evans 1975: 2-3). The particle size of Oxford clay is finer than the Boulder clays of the region resulting in the longer retention of water within this geology (Rigg 1916: 365). Additionally, the degree of inclusions within the parent material is important too as they influence drainage and the heaviness of the soil. Settlement on concentrations of such deposits may have therefore been more visible and viable due to these discrete areas being better drained (Clay 1996: 9).

Secondly, it is possible that people in prehistory were largely avoiding these areas due to their unfavourable conditions for settlement and agriculture. There are three areas in particular
where no archaeological cropmarks have been identified. These are: the Tempsford Plain to the east of the study area, north-west of Great Barford, and north and south of Moggerhanger. Rigg’s work (1916) detailing the soils, geologies and crop yields of an area centring on Sandy, states that historically, the Tempsford Plain has been witness to periods of agricultural abandonment due to great difficulties with waterlogging, unfertile and heavy soils (1916: 395). Furthermore, the Oxford clay areas surrounding Moggerhanger were seen as problematic too, however, they are better drained than the Tempsford Plain (1916: 396). Could this have been the case in prehistory? Or is this a relatively recent phenomenon? Certainly, with the deforestation of these zones, soils will have degraded gradually over time transforming the rich brown forest soils into leached, non-calcareous gley soils less suitable for settlement and agriculture than the more fertile, lighter river valleys (King 1969: 7; Romans & Robertson 1983: 136).

Conclusions
The research from which this article is derived (Mills 2002) has highlighted the problems of detecting sites on clay geologies from the air. It allows for a number of statements to be made and suggests questions and further research that may help clarify our knowledge of past uses of clay soils.

Statements
- Clay geologies cannot be treated as being homogenously inferior for archaeological cropmark production, as variations in their visibility occur within different clay geologies.
- With increased aerial reconnaissance over the clays at suitable times of the year, more sites have been discovered. Nevertheless, consideration needs to be given to the type and nature of clay that sites are occurring on.

Questions and directions for further research
- Now that a significant distribution of sites has been identified on Boulder clays, might it not be unreasonable to eventually see a greater pattern of settlement on the Oxford clays?
- Does the greater visibility of archaeological cropmarks on the Boulder clays indicate a past preference for such soils over the Oxford clay?
- Was settlement on Boulder clay seeking and utilising gravelly deposits (Clay 1996: 347; Coleman in Shotliff & Crick 1999: 32) or is this apparent trend due to the relative ease of identification of crop-marked features on those deposits?
- The different cropmark distributions on the Boulder and Oxford clays need greater investigation to better determine the distribution and character of archaeological sites, as well as whether specific zones of the Boulder clays were being preferentially utilised.

Acknowledgements
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References


Rigg, T. 1916. The soils and crops of the market garden district of Biggleswade. Cambridge: CUP.


The Unknown Prekmurje - Records Of The Region’s Past From The Air

Branko Kerman

The exhibition *The Unknown Prekmurje - Records Of The Region’s Past From The Air* presents – with the help of air photography – the region of Prekmurje with features of its landscape and settlement patterns through various archaeological time periods. It is the result of air reconnaissance of the region of several years, starting in 1997. Alone in the year of 2002 over 100 archaeological sites were discovered with the help of air photography.

The entire area of Prekmurje has been systematically reconnoitred from the air in every season of the year. The bulk of data and archaeological aerial photos come from the flatland part of the region, between the Mura river and the Ledava river; the hilly Goričko part of the region with woods and streams is not well-suited for aerial photography.

Why the term ‘unknown Prekmurje’? It is due to the fact that the perspective from the air makes a very different view of landscape, also as regards its settlement in the past. Archaeological structures are disclosed – in the fields and meadows – as vegetation signs in the shape of circles, rectangulars, straight lines and bent lines. With the help of air perspective one can detect potential archaeological sites which have as yet not been researched.

The exhibition is introduced by aerial photos of landscape patterns characteristic of Prekmurje. What comes next are photos of clearly recognizable vegetation signs drawn into the surface as well as aerial photos of archaeological sites, located along the right-of-way of the motorway section Vučja vas-Beltinci and the ring road Lendava, both of which are currently under construction.

The presentation in the catalogue lays stress on the classification of archaeological signs on aerial photography.

With the help of morphological and typological classification of characteristic colour spots of various geometrical shapes which represent the remnants of sepulchral mounds, enclosures, architectural relics, such as farms, Roman villas, military camps, roads and lanes, an attempt has been made at the interpretation of settlement of the region.

A gallery at the exhibition.

Three rectangular ditches of enclosures; the two larger rectangular enclosures have a visible entrance and the smaller one has a pit at its centre; in front of the enclosures there are several pits; on the right there is a circular ditch of a mound.
The most densely populated part of the region was the flatland area between the Mura river and the Ledava river, identified by two areas of characteristic yet different vegetation signs. One area features the spread of circular ditches and the other one features rectangular ditches of buildings. The lines of roads and paths appear in the neighbourhood of rectangular buildings or else they are located at various spots in different parts of the region.

Prekmurje is the first Slovenian region which systematically records – with the help of air photography – not only archaeological settlement patterns but also major environmental interventions which have in the past – and still do nowadays – changed the region in ecological respect.

Installation of circular ditches in the yard of the Murska Sobota castle to celebrate the opening of the exhibition; 19. September 2002

More from Foggia:

Day 1: Sorting students by size for flying teams. This is so that Otto can take small ones when he is tanked up (?) and bigger ones as BC gets lighter.

Cake commissioned by the students to illustrate an aircraft (?)and sites) as they remember them.

Pete Horne preparing for his new job as Head of EH’s Aerial Survey..?
On the front line: a novice view
Biskupin ... but what next? Aerial photographs in Polish Archaeology.
May 22-24, 2003, Leszno, Poland.

Lidka Źuk

The time has come...
Clearly the little town of Leszno in Poland was destined to be of particular importance not only for the beginners in aerial archaeology (Oltean 2001: 43 and my own ‘career’ – Dolatowska, Goliasz, Źuk 2000), but somehow it happened to be the cradle of aerial archaeology in Poland. For the third time Leszno set the stage for an aerial conference (organized by the Institute of Prehistory at Adam Mickiewicz University and Poznań Prehistoric Society), but this time it was wholly dedicated to the state of development of aerial archaeology in Poland. In the current period of economic crisis aerial archaeology once again has to fight for its survival and now seemed the right time for the conference. This would again allow us to present our case in the battle with more traditional and well-established methods. As in the case of workshop in 1998 (Palmer 1998: 3, Stoertz 1998: 6) this meeting was addressed mainly to the Inspectors of Archaeological Heritage who have responsibility for protection and management of archaeological heritage (http://www.archeo.amu.edu.pl/biskupin/). Collaboration with Inspectors appears to offer the greatest chance for aerial archaeology in the light of Malta Convention from 1992 which underlines the importance of using a non-destructive methods. Thanks to the commitment of organisers (namely Jacek Nowakowski, Andrzej Prinke and Włodek Rączkowski), the invitations were sent to all archaeological institutions and flying clubs – 250 envelopes altogether. The call for papers resulted in 22 contributions, divided more or less into four major themes within seven sessions, which were presented and discussed by almost 40 participants.

Why Biskupin?
History and tradition have always played an important role, being a kind of ‘control point’ which helps establish our position and direct next steps. Biskupin, where in 1930’s air photos were used for documentary purposes during excavations, became the symbol of our greatest achievement. It is not surprising then that the organisers referred to Poland’s best known and most persuasive aerial icon and dedicated one session, Only Biskupin? – few words about history, to the past achievements. What was particularly interesting to me was the notice of how deeply the archaeological thinking about aerial photographs is rooted in Biskupin. One cannot escape the impression of some ‘mental’ restriction inside many archaeologist’s minds, which results in the conviction that only excavated sites and collected artefacts are valid sources of information about the past. Aerial photographs were subordinate to them as a documentary technique. This philosophy resulted in some ‘flash in the pan’ attempts to widen their use after WWII. These few opportunities for reconnaissance, organized despite political and administrative restrictions thanks to the personal contacts with military officials, were utilized mostly for recording already-known Medieval strongholds. We may ask just how many picturesque views of a favourite stronghold are necessary?
**Inspectors’ jigsaw**

As can be expected, the conference addressed to our Inspectors was primarily designed to meet their needs. A wide range of subjects was discussed in the session, *Aerial archaeology and Heritage Management*, which covered almost all aspects of their work. These are:

- **Recognition and recording of archaeological sites.** Results of an integrated research project in north – east Poland were presented by Zbigniew Kobyliński, Krzysztof Misiewicz and Dariusz Wach. This applied non-destructive methods including examination of aerial photographs, fieldwalking survey, electric and magnetic methods to record previously unknown or unidentified archaeological features.

- **Protection and management of archaeological heritage.** Under that heading two different versions of the same story were presented. First, the efficient protection of archaeological sites which stand in the way of development work, requires very strong arguments. Second, when the rescue excavation becomes inevitable, very convincing argument is necessary in order to negotiate better conditions for archaeological works (that is to get more money from the developer). In both cases aerial photographs can be irreplaceable and very persuasive tools, as was demonstrated at a levelled sites at Osieczna from which fieldwalking revealed only 3 pieces of pottery, while photographs recorded an extensive and well-preserved settlement. The success of the aerial photographs was that the investors believed in what they can see...

- **Improvement in data management and utilization.** The session, *Archiving and making aerial photographs accessible for archaeology* through the creation of easily-accessible database was also viewed through the Inspectors’ lenses. At least three different projects were presented, from manual methods to advanced GIS system applications. Software called Aph_Max was presented by Andrzej Prinke. This was designed to meet the needs of cataloguing photographs which were taken during the Leszno workshop. What makes it particularly useful tool is the module that enables its integration with other sources of information (textual, geophysical examination, fieldwalking survey etc.) on a background of topographical map within GIS system application.

My conclusion on that part was rather short: the more you know the better you work and it seems that aerial photographs offer rather huge pieces of information to the otherwise ‘full of holes’ jigsaw called ‘protection and management of archaeological heritage’.

**Bridge between, or Problems with air-photo interpretation**

Sooner or later we (by whom I mean all interested in aerial archaeology) will have to face a problem of how to pull out useful information from the photographs. And it will happen rather sooner... Personally I’m not scared as I was trained by Rog but others, less lucky than me (and without Polish version of David Wilson’s book) have to rely on their intuition and learn from their own mistakes as was shown in a very joyful paper by amateur archaeologist Krzysztof Maciejewski. Another contribution showed use of GIS for creating layers of environmental data that provide a background for archaeological interpretation. This integrated approach helped to answer some of the questions of interpretation and ease the interpreter’s doubts.

I think that here can be placed the ‘technical’ papers from the session, *Air photographs and technology*. One dealt with the problem of image distortions and methods of its improvement, and another offered an approach to half-automated interpretation. An original and hardly-
classifiable contribution was given on the role of aerial photographs in school history curricula. Well, the problem still remains open – how do we teach kids interpretation?

**Last but not least: From air photographs to integrated research projects: achievements and future prospects**

Much attention was paid to the research projects that are currently run by various archaeological institutes in Poland, but obviously the session was dominated by the local group of archaeologists from Poznań. These projects are rather small-scale in terms of their study areas, but already a really good lesson has been learned, especially in the Kujawia region of central Poland. This is one of the best-investigated regions, but three hours of reconnaissance proved that it is still possible to record not only new sites, but also completely new categories of monuments. This latter at Szarlej, which is interpreted by the Kujawia specialist as the Neolithic enclosures called a rondelle – a class of monument previously unknown in Poland. Somewhat more exotic, but showing perfectly the paradoxes of archaeological thinking, was the Peruvian example by Mariusz Ziółkowski who used aerial archives as a prime source of information to guide excavation. This method, learned from Americans, is virtually ignored in Poland but shows that we may still have much to learn from the end of the world.

**Goat-made iron-oven and other Polish peculiarities**

The meeting was a great chance to exchange ideas and experiences which were gained in course of introducing aerial archaeology into various projects. So what are the main obstacles that we have to fight with? Fortunately the administrative barriers, which can easily discourage those less persistent, are less awkward than couple of years ago. For example, since 2002 we don’t have to apply for permission to take and publish aerial photographs. Unfortunately it’s not enough – much more difficult is to overcome barriers in archaeological minds that are built on the following very stable stereotypes:

- **Air photos are useless and expensive.** That myth could be easily refuted by the conference itself. A pity it was hardly used at all as the main opponents of the method didn’t appear, having made up their minds in advance that it’s not worth spending a penny to attend a conference about such a useless and expensive method. From that background it is not surprising that in years 2001-2002 the Head of the Heritage Protection Service for Province of Greater Poland gave no money for reconnaissance.

- **Thinking in terms of single sites.** Aerial photography becomes a very expensive tool if, when archaeologists finally ask for help, it is to request illustrations of one particular site. If such flying is undertaken there is a good chance that their site won’t show and they also ignore the twenty others that are recorded on the way to their single and invisible target!

- **Lack of knowledge** about the main principles of the method, which results in ‘no results’. It is sometimes easy to convince an inexperienced interpreter that circles recorded on the grass indicate traces of goats’ activity (they were too small for cows) and not those of Iron Age metallurgists. He can understand his failure. But most archaeologist believe that only advanced techniques (e.g. multispectral photographs) and interpretation made by ‘specialists’ (usually trained in environmental sciences) can help reveal site hidden somewhere inside the photograph’s layers. The ‘no results’
that usually follows it is explained by ‘difficult Polish conditions’, because they are
deaf to the argument that an ordinary photograph taken in the right conditions and
then interpreted by the archaeologist him/herself, are the two main factors to achieve
success. That simply leads to the first point – aerial archaeology is useless and
expensive.

So we end up with no money, no interest and disbelief. A vicious circle?

... and what next?
The two previous Leszno meetings were regarded as the great successes both in terms of
participants (numbers and their engagement) and achievements. Was the third time also
lucky? All the stereotypes mentioned above (and few more) resulted in minimal interest
amongst archaeologists, which placed the conference on the verge of archaeological events.
This is bad news. Although the invitation was sent to all institutes only a few archaeologists
answered, mainly those who participated in the 1998 workshop and later applied aerial
photographs in their projects. Well, above all this is good news, because it proves the
workshop’s (and tutor’s) efficacy. The dominant, rather depressive impression was that the
conference created mainly a forum for convincing those who are already convinced, but
despite this it was worth seeing a few of the newly-converted. Also, one of the most important
benefits was the chance to meet and discuss the further steps that should be undertaken in
order to popularise aerial archaeology in Poland and I was really impressed by participants’
inventiveness.

Nobody doubted that aerial photography should be a standard tool in archaeological
equipment, but to obtain that aim much personal effort from all interested is required. An
‘official’ way, through the legal obligation to take photographs before developer’s work
seems to be premature as one can hardly expect any positive results from untrained observers
forced to take photographs at any time of the year. That this can bring results was shown
during the conference, especially by young Inspectors from north-east Poland who got
involved in aerial archaeology through the influence of Z. Kobyliński.

It is possible to convince an unbeliever if a persuasive argument is used. The best way is to
find his/her Achilles heel as Włodek Rączkowski managed to do when he ‘allowed’ a VIP to
discover his favourite type of neolithic site on an air photo. Thanks to that, the archaeological
VIP-s for Province of Greater Poland participated in the event – maybe next time they will be
more inclined to allocate some funds for reconnaissance. It also gives some hope that aerial
photographs will be included in the postulated second stage of the Polish Archaeological
Record (AZP, see Rączkowski 1996). This aims either to verify inaccurately-investigated
areas during the first stage or to pay more attention to micro regions of the most interesting
settlements (it hasn’t yet been decided what shape AZP II will take). In both cases aerial
archaeology can play a vital part. All these achievements resulted from individual’s
commitment – apparently from that experience an original solution to our troubles emerged –
that is to appoint a missionary, who will spread the Good News (in form of lectures and short
training courses) around Poland. I have a great pleasure to inform you that Włodek
Rączkowski has been unanimously appointed to that task. We hope he’ll not end up as a saint
martyr.
To make our missionary’s life easier, two further steps were suggested:

- **To create an association** (as it usually speaks louder than individuals) with aims to coordinate projects and advise inexperienced beginners (to prevent people from digging goat-made sites).

- **To publish a manual**, based mainly on Polish experiences. This suggestion resulted in immediate observations by participants, who presented a diverse range of knowledge on the subject – from a personification of all the main sins to advanced approaches – and the conclusion is that sometimes a pertinent tip is good enough to start filling the gaps.

It was also agreed to publish the papers presented during those three days in order to popularise recent results of ongoing projects amongst a wider archaeological public. An important issue on easier access to the archives was also heavily discussed as archival photographs (mainly taken for cartographic purposes since 1960’s) appear to have great potential for archaeological research.

Attention was paid to alternative ways of development in aerial archaeology, mostly to the cooperation with aviators, who may provide a recipe for ‘surviving with no money’. Thanks to Krzysztof Maciejewski it was possible to organize 14” hours of flights and record 76 sites when the officials failed. To date the most spectacular success of the conference has been the engagement of European Champion in Precision Flying, Krzysztof Wieczorek, to provide a few hour’s flying in southern Poland – finally we can feel safe in the air.

Promotion of our methods may also benefit from ‘public disclosure’ in form of popular books, leaflets and information published in aviators’ (but not only) newsletters.

And we can’t forget about teaching kids – they are our future…

**Acknowledgements**

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**References**


http://www.archeo.amu.edu.pl/biskupin/


Summer (or winter for some) flying 2003

An emailed assortment of comments from around the world.

Austria. This year was my best flying season. Within 25 hours or so, I had almost 500 sites (Foggia not included)! (Michael Doneus)

Poland. Did some flying this summer - some in proper aircraft (Wilga) [in Kujavia region and near Cracow] and some using UL [in Poznan area]. Results are very good, cropmarks were fantastic - mostly pits but also some barrows and Neolithic (?) enclosures, trapezoidal houses etc. There were some strange features also. (Włodek Rzączkowski)

Hungary. I covered only the part west of the Danube river twice in June, was showing good to locally excellent marks. I do not dare to call it a great summer for aerial survey in Hungary. Cereals were very early with harvesting of barley and winter sown wheat starting at mid-June on light soils. (Otto Braasch)

Germany in general had a rather short and extremely hot season with great variations in occurrence and in quality of sites visible in cereals. Grass and sugar beet are still in the game. West of Bavaria at Baden-Wuerttemberg I have seen wheat and barley on known rich sites without any traces - sufficient moisture at the first half of the vegetation period was followed by sudden extreme heat and a drought with intermittent storms. Conditions at Brandenburg, which is very dry, were good on rich clay and generally fair on sand. Up to the Baltic coast only few crop marks were visible in the west of Mecklenburg-Vorpommern, conditions were better to the east of that state with some good sites close to the Polish border. (Otto Braasch)

Belgium. The joint project with Ghent University was continued and the two universities, Ghent and Leuven, now receive special funds for conducting archaeological aerial surveys from the Flemish government. The Leuven University continued to fly over the eastern part of Flanders. In the early spring we discovered several new circular and disc-shaped features that indicate former prehistoric or Roman burial mounds, made visible by soil-marks (mainly in the loess-area of Central Belgium). In the early summer a few cropmarks were seen, possibly an indication for former Celtic Fields. From the summer on, the aerial surveys will be concentrated in the northern sandy-soil region of Flanders. We expect that the continuous dry weather conditions will reveal a lot of new archaeological features in this area. (Rene Pelegrin, Marc Lodewijckx)

New Zealand. In April 2003 I undertook a vertical survey of the Shotover River near Queenstown in the South Island. This is an area of steep mountainous country (rising to 2600 m a.s.l.) with many gold lodes and narrow Pleistocene terraces in the valley floor. Mining using California sluice monitors (creating a strong jets of water) was carried out from about 1890 to 1940. The modern landscape consists of high dissected terraces, tail races for waste water, holding dams on the upper terraces and miles of supply races (leats) from the surrounding mountain streams. The photographs were taken at an original scale of 1:16,000 on to 6 cm square negatives, with any one negative covering the width of the valley floor (about one kilometre). I will be mapping off the photographs at about 1:8000 scale for an historic landscape study. (Kevin Jones)

Britain. Perhaps more bad than good, the exception seeming to be the many parch marks – often as early as April (so much for theory…) – in Wales. As in the past few years the summer began well but rain at the crucial time levelled off any significant moisture differences leaving occasional goodies to be hunted while much that was known remained unseen. More details can be found in Damian’s bulletins (and congratulations to him for keeping them flowing between his numerous flights) and Derek Edwards’ stereo pairs, which sometimes include a few extra bits. (Rog Palmer – from ?failing memory)
Aerial photography: the use of wheelbarrows

Gwil Owen

Ten years ago to the issue, bribed by, and under the influence of our esteemed editor’s home brew, I wrote for AARGnews an article on the aerial photography at Tell el Amarna in middle Egypt. On the off chance that a sequel might now be appropriate...

Amarna, for those who have been less than diligent in remembering what was written in 1993, was the newly built capital city of the Pharaoh Akhenaton, founded on a then green-field site roughly half way between Cairo and Luxor on the East bank of the Nile. Started in the mid 14th century B.C., it lasted less than 30 years before Akhenaton died, after which the government abandoned the site for the more traditional lifestyle of Memphis. Now the remains lie just under, or just breaking through, the desert surface, with a few structures managing to reach to first floor level. Over an area of about seven by three kilometres can be found palaces, temples, civic centres, and residential suburbs. Surrounding this are tombs, quarries, access roads and the usual infrastructure of a thriving town. A classic site for aerial photography, even though I say it myself.

Murphy’s law in the shape of Egyptian security bureaucracy then intervened. In January two of us waited at the local military airport while the plane was flown in, and every day we bumbled into the office from our hotel to be told that the paperwork wasn’t yet complete. Five days later joy was unconfined; yes, permission to fly! Kit was loaded, we stood by the plane, guarded by a troop of very young soldiers with Kalashnikovs - it appeared that while on the tarmac we were not allowed to look at the line of Czech surplus fighter jets lined up twenty yards away. Never mind, we waited, and then we boarded, and then we disembarked and went back to the office. There we were told that the permissions supplied only allowed the plane to land once at the airport; since it had now done that, it could only fly back to the Red Sea. Which it did.

I think British Gas were more disappointed than we were, for in the Spring came another offer, this time via their security consultant, who had a connection with military security, whose commanding officer was a helicopter pilot, and who just happened to need some flying time on his annual record. Now this operation was something else. Naturally there was no hassle at all regarding paperwork; no one argues with the Egyptian security services. In addition the plane wasn’t a small civilian job, but a whisking great Russian troop-carrying gun ship (I think it was called a Hind?). Two big jets over the cockpit, little stubby rocket and gun platforms either side, and what was best, a huge flat-floored loading bay with easy access to a vertical viewpoint.

We planned a two day programme to cover the main part of the city, including the civic centre and its palaces and temples, a flyby round the city perimeter to look at the tomb sites and some sites allied to them, and coverage of a temple/palace site a few kilometres to the north of the city centre, that we were currently excavating. CUCAP in Cambridge very kindly lent me an aerial Hasselblad for the B&W shots, and we shot 35mm slide, negative and false colour infra red

Part of the central city, from the helicopter flight in 1993.

By 1993 we had operated a kite, followed by a small hot-air balloon. In that year, however, we were lucky to be offered the use of a helicopter by British Gas from their Red Sea operations; a more than generous offer with no strings attached and no costs to the expedition.
as well. I shot the B&W, a colleague, Tim Lovelace, most of the slides, and our director the print film - well you have to give directors something to do, don’t you?

It was a bit disappointing in that we ended up flying from late morning onwards; it seemed the pilot wouldn’t fly in less that absolutely clear visibility. All the shots worked, but not as strikingly as in early morning or evening sun. The infra red showed good results over the site under excavation.

False colour image - much enhanced - of 1993 excavations. Traces of structures appear in damp ground at top right.

This was almost a rescue dig, as the site was under threat from water seepage caused by nearby agricultural irrigation. Traces of buildings within the larger temple precinct showed up clearly.

There were, of course, the usual comic capers in the operation. The plane had been converted to one side for seats and the other with a large fuel tank. Ten minutes into the flight one security man sitting with his feet in a puddle of fuel was caught passing the ciggins around and just about to strike the matches. As we flew, I sat more out than in of the loading bay, shooting straight down past my feet, and was tethered to the pilot’s chair because the wire cable wasn’t long enough to reach the proper mounting points. I thought this would be an amusing anecdote for later. So I brought it up in the bar a week later to meet an embarrassed silence, followed by Nwell, actually, for the first twenty minutes you weren’t connected to anything at all”. And as for the saga of getting the films out from the security service in Cairo, it’s another long, long story.

What the helicopter flights did do for us was to alert us to the other areas around the city where we could reasonably expect aerial survey to be productive. Over the last ten years, therefore, much of our photography has been over the hinterland of the site, not just the bits being dug, or the known buildings due for remapping.

Also in 1993 it became apparent that the hot-air balloon was just a tad dangerous. Refilling little propane canisters using a home-made rig in the hot sun scared me rigid, and after the balloon took off one day with a string still wrapped round the director’s thumb, we said enough was enough. The picture of him scampering across the site like a mobile statue of liberty being towed by an oversized party balloon is an image to treasure.

The next year we acquired a helium blimp, six metres long, two and a bit wide, and, well, blimp shaped. And bright red. This was courtesy of an American group ‘The Amarna Research Foundation’. They continue to support us: last year they replaced the somewhat-battered envelope with a new one, all the way from Blimpworks in the USA, and all for free. Good people.

A blimp has distinct advantages over a round balloon. A round balloon tends to tip over in the wind, and the camera platform with it, making aiming the camera awkward. The blimp

The 35mm camera with the spy-cam in the hotshoe; the electronic boxes for both sit above.

flies nose to the wind, can be trimmed fore and aft by adjusting the camera cradle position and is pretty stable laterally. The camera angle can then be adjusted by eye to give a very close to vertical viewpoint. We have found out, too, that
flying the balloon with a tether either side at 30 to 45 degrees angle lets us tow it to a precise position, and, familiy enough, a gentle tug on one rope or the other will swing it round ten degrees left or right without upsetting its verticality.

For trips of a kilometre or less we walk the balloon to the area to be covered; longer journeys are in the back of a pick-up truck. At ten miles an hour or so the balloon is easily manageable when fully inflated. If less than full, it ducks and dives around in very little breeze. Because of this characteristic, as the first of our envelopes came to the end of its life, we lost it twice among the cliffs that surround the site. Once it landed itself on top of the cliff with little damage but needing a long climb to unstick it and the ropes from the rocky terrain. The second time, and after which we had to admit that a new envelope was necessary, it managed to drive itself right into a vertical face below our feet and to split open the camera in the process. Today, we think we have a good idea of how to handle the blimp in winds up to a stiffish breeze. Beyond that it goes home. As you might expect suitable wind conditions are usually in the early morning in the desert, just when the light is best too.

What have we been looking at in particular these last ten years? One thing to bear in mind about Amarna is that much of the city was excavated early in the last century. Consequently spoil heaps now cover a lot of what should be easily identifiable building. We fieldwalk from on high, using sherds heaps as clues to what sort of structure may be underneath, and using the general pattern of heaps to plan old excavations or, indeed, modern native fossicking. This approach has born fruit in one spectacular area. It has always been a missing link question at Amarna; “where are the local cemeteries?” In conjunction with our mapping team we have found two so far. The clues for the first were local diggings out of season bringing up bone scatter. The aerial shots reveal an extensive cemetery by the eastern cliffs in which are cut the tombs of the civic dignitaries. Only this last year we hit the second site, again initially suggested by bone scatter. This time, however, that was on the flat desert in the outwash from a wadi. We checked the area of the scatter, both in normal and in false colour, but to no result. Then, moving up the wadi, we saw a few depressions indicating the original graves. From the air these round depressions are clearly visible, with other linear features not seen on the ground.

In, and on top of the cliffs are many quarries. Since 2000 these have been a particular focus for the aerial survey. The cave quarries are spectacular in themselves, but it is only from the air that the full extent of stone cutting activity can be seen. Easily visible are not only the precise cutting lines, but stone hut circles for the quarrymen themselves. Should you, of course you do, ask how sure can we be that these surface cuttings are from the right period, the answer is that Amarna stone blocks are of a specific and unusual size. The patterns are quite distinct.

These forays take us into the hinterland around Amarna. We have been to the Royal Wadi to the site of Akhenaton’s tomb itself. The
half hour drive is well worth it. As you would expect the rugged terrain is well brought out by aerial photography. Here, too, we have been chasing sherd dump patterns in an attempt to locate buried tomb entrances.

In the city itself we run two concurrent programmes each year. There is a running programme of checking the mapping of the site, both the earlier 1920s and 30s and the later 1980s surveys. This is at the top of our height range, currently about 500 feet - the tethers are 600 feet and we lose some height from the tether angle.

The house of Ra-Nepher under excavation.

At much lower elevations the progress of whatever excavation is on the go is followed. Last season and this, a house has been dug, not more than a few hundred metres from the dig house. This building is a bit odd for Amarna. The city, being such a short lived phenomenon within the 18th dynasty, is famous (reputedly) for its singular lack of stratigraphy. This house, belonging to a certain Mr. Ra-Nefer, shows distinct phases of construction on the same floor plan, not just successive developments tacked on. In fairness, other parts of the civic centre of Amarna do show similar overlaying constructions, but less dramatically so.

Lastly, this year I acquired a new toy for the balloon; a remote little TV spy camera which will transmit down to a laptop computer on the ground. Though our team has now quite a good judgement of vertical placement, obliques have always been difficult. Visualising the angle of the camera support, and getting the right height for that just to include the horizon has been difficult. Funnily enough the verticals, too, are less precise as the balloon comes lower. Anyhow that is all behind us now. With the new remote every shot can be previewed.

The south eastern corner of the city. The house of Tutmose the sculptor (he of the famous Nefertiti bust) is at middle right.

The blimp, the team and the barrow.

The laptop, on which all this depends, is transported round the site in its own custom modified wheelbarrow. Ten years ago we used a wheelbarrow (its handles to be precise) as a rough indication of resolution from the highest of the hot air balloon runs. Isn’t technology wonderful?
Wings over Armenia: April-May 2003 – report and reflection

Rog Palmer

Unless there is a hidden archive of targeted photographs jealously guarded by someone, the dubious honour of being the first trained archaeological eyes in the air above Armenia goes to Antje Faustmann. In May 2003 the weather allowed her to make several flights using the paramotor during which she took more than 250 oblique photographs of approximately 50 targets of archaeological sites ranging from bronze age defended hilltops to villages that were abandoned in the Soviet era. For those of you who haven’t met her, Antje attended the Potsdam meeting in 1994, the Hungarian training course in 1996 and the NATO Workshop at Lesnzo. She is now a post-graduate student at the University of Freiburg and is sufficiently athletic and brave to fly with the paramotor.

The flying team was Karen Martirosyan as pilot and Antje as archaeologist/photographer. During the two weeks spent in Armenia we all learned a lot about using the paramotor and my toy digital camera. The PM is extremely sensitive to wind conditions and even with the comparatively lightweight team (Karen = 60 kg, PM = 40 kg, Antje = 50kg) there were several days when it was too windy to take off with two people. The other thing that takes a bit of getting used to is its slow flying speed.

While this is good for observation and decision-making before photography it does mean that a 35 min flight (max duration with two-up) can examine only some six km squares while flying 20-25 km. I did once work our how many flights it would take to examine the whole country, but that figure is lost in the murk. Before you all say “told you so”, I’ll remind you that we have to use the PM as there is no other viable means to get into the air. One other thing that we learned after breaking two wooden props, was to invest in a metal one! Karen and Antje also ran out of fuel on one occasion when they chased one site too many. She described it as suddenly going quiet but that otherwise flying was the same as usual.

From the ground we saw them suddenly turn into the wind and sink below a hill but the landing was as good as ever and no road signs intervened. I’ve still got mud in my sandals from the trek to recover them.

We also had to learn to use my digital camera (a Nikon Coolpix 990) in the air. This was a bit trial-and-error but eventually I got the thing set to focus at infinity, with a reasonably high shutter speed (which is not as fussy as usual as there is no aircraft vibration), and to save pics at its best resolution. These settings gave us about 50 photograph per flight as Antje didn’t fancy changing the memory card in the air. We continued to focus our attention on the Ushi area (see previous notes) and, in addition to the obvious archaeological features, also recorded the present landscape and landuse and selected natural features such as river meanders and hill-slope erosion. In addition, Karen

Antje Faustmann ready for takeoff. Note GPS aerial on helmet, camera case hanging from belt, and smile.... 4 May 2003.
Martirosyan made three solo flights to survey specified areas and record them using a video camera. The resulting films show that he is developing a perceptive eye for identifying archaeological features and it is intended that he continues to fly between my visits to record other parts of the country. However, the resolution from the video is lousy and such films can only serve as a guide for still photography at a later date.

Antje at work. This photo, with nothing under her casually crossed ankles, made me feel worried and a bit guilty that I’d asked her to fly the paramotor. 4 May 2003.

Why the toy digital? Mainly because I own it and it is much smaller and flatter than a conventional 35mm camera so that if there is a flat-on-the-face crash during take off, neither camera or photographer get too damaged. As it happened, the ‘camera case’ I had made out of a 200mm lens case and a couple of elastic straps worked very well and was secured to Antje’s belt while the camera strap was looped around her harness as she was being strapped in. The camera was easy to extract and put away in flight and could be operated using one hand while (I was told) the other one gripped the harness straps. However, as our take-offs improve, it would be better if we could acquire and use a DSLR camera with top-quality resolution.

One evening in May Roger Budd of the British Council in Armenia (donators of the paramotor) organised a media event during which the paramotor was flown on a photographic flight. Some 25 journalists, invited academics and uninvited (but always welcome) local children attended and our work was featured on several TV news programmes and was in at least two daily papers. The project’s close relationship with Bars Media Documentary Film Studio has advantages to both parties. We have use of their video camera, display and editing facilities and they are filming our project as one of their current documentary projects. Their short demo film of work to date was well received at the recent Cannes International Film Festival and Market.

Several good things came about when we were looking at the photos back in Yerevan. While trying to site them using 1:50,000 maps, Hayk and Tigran both realised that maps of larger scale were essential. Good. Hayk, the academic whose main interest is the Hellenistic period, also took an interest in the villages deserted in Soviet times and agreed that they too should be considered as ‘archaeology’. This may bode well for their investigation as there is a chance that some of the ex-inhabitants may be locatable so making it possible to compare archaeological interpretations of those villages with memories from people who lived there. Ian Hodder would love it!

Ruined village, Aragats foothills. 4 May 2003.

On the ground, as well as trying to locate the photos and begin a catalogue we did a little work on the GIS with Lilit Vanyan and, with Mariam Fainberg, we added many of Antje’s air photos and did some final tweaking of the web site (www.archaeology.am). As usual, Vardan Hovhannisyan found us some space at Bars Media Documentary Film Studio and, having made a start with Wings over Armenia, his
filming ideas have now extended to proposing a *Wings over the World* series. Our work, and contact with Hayk Hakobyan, is beginning to have a small impact on Armenian archaeology. Absence of maps and mapped information as well as the traditional view that ‘archaeology equals excavation’ makes it seem to me that archaeological practice in Armenia is much as it was in Britain in the pre-Crawford era during the 1920s [Dave Maynard working ‘next door’ in Azerbaijan says much the same of his people]. One main influence that Chris Musson, Antje and I have had is to introduce concepts of ‘landscape archaeology’ – something that we have also inflicted on site-centred Italian archaeologists. Hayk is now eager to develop landscape studies in Armenia and accepts that such things as field systems and Soviet era features are valid archaeological objects. From October he is to begin teaching a course at Yerevan State University on *Archaeological Methods* in which he plans to include at least 15 hours teaching on aerial survey. This, along with the few lectures I have given, will raise the awareness of Armenian students to the topic and may lead eventually to PhD-level study of the data we hope to accumulate from further aerial survey.

![Undated ruins. 3 May 2003.](image)

**Future work?**
The high number of sites identified from the satellite images suggests that this is a prolific source of information whose examination could usefully be extended to other parts of Armenia. Results from the first air photographic surveys from the paramotor shows that much remains to be discovered in Armenia and that these new features are likely to fill the landscape between sites currently known. Archaeologically these are likely to date from the neolithic and bronze age to recent times. The wealth of information about sites that were abandoned as a matter of political policy during the Soviet era (including medieval and later villages, farms, field systems and terraces) should also be recorded while it survives to provide a database for future study. Air photographs of known sites will provide a record of their present condition as a guide to any conservation policies and also serve as ‘public relations’ documents to encourage support from other archaeologists. With Hayk’s forthcoming teaching it is hoped to encourage post-graduate research, ideally in parallel with a western student.

I think it is essential now to include local student involvement. One thing that has become apparent from the AARG-run courses in Europe is that it is one thing for one of us to go and flit around taking photos but that a higher level of archaeological involvement will only occur when people get airborne over their own countries. These thoughts are presently holding me back from making another British Academy application (this recent visit used the last of their grant). Sure, I could go ahead and design a *Development of the landscape* project – something that Antje is also keen to pursue – but without much local input there seems little point. Hayk is a wealth of knowledge and information and will be and essential collaborator in any future project. But his request to AARG was for help to establish aerial survey. We now have the means to do this and can teach Armenians the basics of flying, photography, interpretation, mapping and the necessary ground-based non-destructive investigations to add factual information to sites photographed. The paramotor is not a vehicle for the aged or unfit. Yes, I’d like another bash at it, but I’m not sure if my correct age is that of my mind or my body – there’s an increasing difference. Surely the way forward from this point is to teach these skills to the generation of Armenian scholars who are likely to undertake such work.

Maybe it’s just a phase I’m going through…?
Statement on priorities for European aerial archaeology

Submitted to the Europae Archaeologiae Consilium (European Archaeological Council) by the committee of the Aerial Archaeology Research Group, 2nd July 2003.

Background

Early in 2003, AARG was invited to establish closer links with the EAC and advise them on pertinent matters relating to European aerial archaeology. It was felt that this would be best done through a European Working Party for Aerial Survey, and the setting up of such a working party is to be discussed at the 2003 AGM. As an interim measure for the EAC’s July meeting, the Chairman and committee put together the following document, partly based on original text by Bob Bewley, to indicate the direction of the Research Group’s thoughts and interests.

Opening statement from AARG

AARG, in its constitution, states that its object is to:

- “...advance the education of the public in archaeology (including the man-made landscape and the built-environment) through the promotion of high standards of research, application and communication in the fields of air-photography and other methods of remote sensing.”

The groups’ stated aims include those to:

- encourage the dissemination of information about aerial archaeology in newspapers, journals and other publications, and through radio, television and other media;
- provide, where appropriate, advice and recommendations on matters involving aerial archaeology and related applications of remote sensing;
- establish and maintain liaison with appropriate individuals and institutions at local, national and international level.

The AARG committee feel that AARG’s role as a research body, not a political body, make it appropriate that we advise the EAC in matters where political or other pressure may be usefully applied.

Priorities for European Aerial Archaeology.

1. Terminology: The term ‘Aerial Archaeology’ should always be used to denote linked programmes of aerial reconnaissance, photo interpretation and mapping.

2. Resources: Aerial archaeology sits at the very start of the processes of discovery, recording, understanding and preservation of the European resource of buried, plough-levelled and other upstanding heritage sites. Subsequent research may require ground based remote sensing, field-walking, and as a last resort, excavation. Without a properly funded programme of aerial archaeology at the beginning however, sites will remain undiscovered at best, or at worst at risk from continual erosion or destruction.
3. **Erosion, destruction and recording**: The nature of the ‘eroding resource’ of the plough-levelled European heritage makes adequate funding for programmes of aerial archaeology imperative now. Procrastination for one or more decades in commencing such programmes in regions or countries where work is currently hindered can only mean the eventual destruction of unrecorded sites. The All Party Parliamentary Archaeology Group (UK) has stated the need for the abolition of ‘class consents’ that still allow agricultural operations over protected sites in the UK. AARG is opposed to these kind of outdated regulations both in the UK and Europe.

4. **Archives: Using the existing image resource**: Access to existing collections of aerial photographs must be increased and facilitated for all. Funding projects must rapidly address the lamentable situations that exist in many European countries where uncatalogued collections of historic photographs continue to deteriorate without interpretation or record, or recent oblique photographs languish without interpretation or documentation.

5. **Skills**: Training must be recognised as an issue, and broadened. Retiring specialist staff should be replaced or shadowed. Lapses in pre-existing programmes of aerial archaeology, in Sweden and Holland for example, should be addressed.

6. **Access to the skies**: Over-bureaucratic regulation of aviation in a number of countries means that active aerial reconnaissance to document the plough-levelled landscape, and subsequent research and investigation of the results, is being hampered. Recent resolutions by the European Association of Archaeologists and the International Council of Aircraft Owner and Pilot Associations make such regulation untenable.

7. **Aerial archaeology on the academic agenda**: Overcoming the professional and academic reluctance to accept the value of information derived from aerial survey continues to be a problem. Aerial archaeology as taught in some universities often presents an outdated view of the profession and technique which is rarely tolerated in the sphere of ground-based remote sensing. The dogma that a site cannot "exist" unless it has been excavated is all too common in the upper echelons of academia in ALL countries.

Toby Driver: Chairman, AARG, for the AARG committee.
Additional text by Dr Robert Bewley, English Heritage.
**Cropmarks**

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

**High resolution black-and-white films.** News from Otto about three new films that can be used with special low contrast developers for pictorial photography:

Agfa Copex Rapid Film and Kodak Imagelink HQ Microfilm (resolution 800 l/mm!) with SPUR low contrast film developers:

'8x11film.com', Gescherweg 63, D-48161 Muenster, Germany
e-mail: <info@8x11film.com>
web: <www.8x11film.com/spur/navdeu.html> (German text only)

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Fujifilm Neopan 100 Acros Film (ISO 100, resolution 400 l/mm!):

Fuji Photo Film Europe GmbH, Heesenstrasse 31, D-40549 Duesseldorf, Germany
e-mail: <film@fujifilm.de>
web: <www.fujifilm.de/engl/index.html> (English and German text)

[Rog: This film can be processed using my normal developers and I hoped to try it during the week at Foggia using Technical Pan in a second camera. But one of my 50mm lenses had been bashed when I fell off a bronze age site in Armenia and comparison would not have been practical. I later used it in the studio and produced results that visually are equal to Tmax 100. Nothing special – and I read somewhere that Fuji BW films are made by Ilford.]

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MACO TP 64c and MACO ORT 25c Film (resolution 350 l/mm) with LP-Docufine LC Developer:

Hans O. Mahn & Co, Photo Division, Brookstieg 4, D-22145 Stapelfeld, Germany
e-mail: PHOTO@mahn.net
web: <www.mahn.net/Frameset.htm> (English and German text)

MACO distributors in the UK are:
Mr. CAD, 68 Windmill Road, Croydon, Surrey CRO 2XP
e-mail: <sales@mr.cad.co.uk>

and

Silverprint Ltd, 12 Valentine Place, London SE1 8QH
e-mail: <sales@silverprint.co.uk>

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**Seamless vertical photography** of Britain (or England??) for sale on a CD-per-county basis at £20 each from: www.edream.co.uk/prodview and hunt around in that page.

**From Toby:**
I'm fairly new to the idea of plagiarism when marking academic essays for the AP teaching at Lampeter University, but I have friends in Aber Uni who say it goes on all the time. When searching for another reason, I came across this website stuffed full of under- and postgrad model essays, free to download. Reading the aerial essay, I half wonder whether I recognise bits of it from a couple of essays I recently marked for Lampeter. If you teach, you might like to be aware of it: http://www.clyes.clara.net/essays/aerial.html

What a bloody con! I worked hard for my degree all those years ago....! It may also be that this website is entirely legit..

[Rog: I had a look at the site and note that the AP essay is years out of date – I doubt if most of us would now point students at the references cited. It seems to be a collection of one bloke’s student essays. Rather him than me – all mine were chucked out years ago.]

**From Chris Cox:**
A plain brown envelope arrived containing a **Convenience Bag**. The package claims that it is for vomit or urine disposal, has patented hand protection, and is ‘Easy for everyone to use, especially children’. For those not used to requiring such convenience, there are instructions on the packet – but no obvious address. For those of you who want to pursue the thing, it’s made by GKR Industries Inc: Model Number 1000HP/7000HP. Comments and field test reports can be sent to AARGnews.

**CR Historic** had rather a nice presentation pack for attendees at their launching do. Chris Going later brought me one hoping, he said, for a mention in AARGnews. Essentially they offer customers (rich customers I guess) digital layers of historic and modern imagery and provide software that can be used for viewing the stuff. Chris had previously shown me a demo of their software which has the ability to slowly blend from one image to the other. It’s an amusing management tool but I’m not sure what serious use will come from it. however, such games are now becoming more commonplace and CR Historic is one of several companies offering similar packages. The bonus in their presentation pack – and possibly one aspect in which they will lead their competitors – was the WW2 material of Britain and Europe that is due to Chris’s own interest in those times. This included a facsimile of the final Evidence in Camera (March 1945) that was devoted to summarising the history and development of PR and PI and showing some of the results obtained from the special PI sections at Medmenham. Evidence in Camera has a modern price (£5.99) on the back and I imagine that copies can be obtained from Geoinformation Historic, Telford House, Cow Lane, Fulbourn, Cambridge CB1 5HB or via www.historicairphotos.com
Books of interest?


In a publication summing up the NATO Advanced Research Workshop at Leszno in 2000, there is a map of Europe showing the current state of activity (2000/2001) in terms of aerial reconnaissance, mapping and photo interpretation (Bewley and Rączkowski 2002: 2). On this map, Denmark is shown as a country where no aerial reconnaissance is conducted. Hence, the greater my surprise on becoming acquainted with a book by Pelle Eriksen and Lis Helles Olesen. “Getting acquainted with” is perhaps somewhat of an overstatement, but thanks to a friend who speaks Danish (my thanks to Andrzej Szubert for his work) I was able to gain a real insight into the content and subject matter of this book, which significantly changes our knowledge of the current state of aerial archaeology in Denmark.

This is a popular research publication, bringing general archaeology and its aerial counterpart within the grasp of the reader interested in the past of western Jutland. The structure of the book conforms to a long established outline for publications of aerial photographs (e.g. Christlein and Braasch 1982). This consists of chronological order preceded by information on the fundamentals of aerial archaeology. From my perspective, the chapter devoted to the history of aerial archaeology in Denmark is of particular significance.

Its beginnings reach back to the 50s of the 20th century. At that time Hans Stiesdal, then curator of the National Museum, decided to devote his time to aerial photography in archaeology. Inspiring him was the content of a German book published before World War II (I surmise that it was the book *Luftbild und Vorgeschichte* 1938) as well as a meeting with St Joseph in Oxford. St Joseph influenced him to obtain a pilot’s license, which finally occurred in 1956. Hans Stiesdal was concerned with photographing mainly Early Medieval fortifications, although he also observed cropmarks (e.g. the Early Iron Age settlement at Hodde). In 1966 St Joseph went to Denmark for the first time and jointly they undertook many reconnaissance flights. During the course of five summer seasons of common reconnaissance, they registered over 200 archaeological sites, among them many that were not previously known. Some of the photographs taken in the course of these flights are held in Moesgård Museum. Unfortunately only a few of these photographs were ever published.

Along with Stiesdal and St Joseph, aerial photography in Denmark was also the concern of N.R. Jeansson, R.M. Newcomb and P. Harder Sørensen. The subject of their interest was mainly the field systems of the Iron Age. The works of P. Harder Sørensen merit particular attention (e.g. 1982). He conducted analyses of Celtic field types and their correlation with particular types of soils (compare Brongers 1976). His work was eventually to embrace the whole of Denmark, but only the first volume devoted to northern Jutland was ever published (Sørensen 1991).

A similar approach was taken in the research conducted by Lis Helles Olesen, who conducted research in the early 80s, i.e. investigations of settlement patterns in the Early Iron Age of western Jutland. She used mainly Basic Cover photographs from the archives. The results of her papers became the basis for undertaking measures for protecting still existing traces of field systems.

Based on the above remarks, it may be seen that aerial photography in Denmark has quite a rich history and very interesting results. It should, however, be mentioned that these works are not well known in Europe. Palle Eriksen’s and Lis Helles Olesen’s book shows the great, unused potential of archaeological aerial reconnaissance. Photographs found therein include some taken in 1992, 1993, 1996, others by Stiesdal and St Joseph, some from the sixties and by Jens Aarup Jensen between 1976 and 1979, and a number of archival Basic Cover photographs from 1954 and 1975. Of interest is the oblique photo of the archaeological site in the course of excavations in Brødbæk, taken by an F16 in
2000 (p. 43) in the course of exercises for sighting in a particular target.

The fundamental part of the book includes a presentation of individual archaeological sites ordered chronologically. Text about each site includes information about previous research, its function and chronology and types of structures discovered. Aerial photographs as well as photos of artifacts found therein or showing archaeological excavations illustrate this description. Juxtaposition of aerial photographs with those taken from the earth stresses the unusual utility of the former in archaeological interpretations. Aerial photographs are supplemented by axiometric sketches, presenting the interpretation of traces of archaeological structures visible thereon (like those in the book by Christlein, Braasch 1982). This allows the reader to undertake their own attempt at interpreting photographs and comparing them with those proposed by the authors.

Photographs used in the book are superbly selected and very persuasive. They doubtlessly constitute a significant argument towards the advantages of employing aerial archaeology. A very significant advantage of the book is the use of Basic Cover archival archaeological photographs. Chosen examples show the great potential of such photographs, despite their not having been made specifically for the needs of archaeologists. The authors suggest that their readers (effectively, I trust) undertake individual attempts at conducting aerial reconnaissance and also work with archival photographs. In both cases it is fascinating to experience discovery. I believe that this book will encourage many Danish archaeologists and amateurs to a closer acquaintance with the advantages of aerial archaeology.

References:


Sørensen Harder P. 1982. The Use of Air Photographs in Celtic Fields Studies, Journal of Danish Archaeology 1, p. 77-86.


Włodek Rączkowski


This paper is a longer version of those published by Davy Strachan in recent AARGnews (20 and 23) – which, interestingly, are not among the cited references. Content is similar but includes reference to viewshed analysis and has an extended discussion that includes additional evidence gained from field walking and selective excavation. These have provided dating and environmental information. The writers keep to the facts in their discussion and are able to identify how monuments may have been integrated with later agricultural systems.

There is a refreshing absence of the symbolic waffle that tends to dominate present-day ‘discussion’ of landscapes, but there is the expected confusing use of ‘crop-marks’ (eg ‘…during the creation of the crop-mark field systems…’) – unless it is only me who is confused … or did they really make fields divided by crop marks in the late bronze age? However, it is very useful to have examples of PI and mapping work and their analyses reaching a slightly wider audience than AARG members.

Rog Palmer

A thoughtful summary of some of Gill’s results from 125 hours of flying over Ireland in a paper includes many well-reproduced photos – monochrome and colour – and extracts from her 1:10560 mapping. The past is approached from a landscape point of view and she describes the role of repeated reconnaissance plus examination of all existing photos to fill gaps in that landscape. This is demonstrated in a chronologically-divided series of case-studies (or in one big case study) in Counties Kildare and Carlow. Some discussion is given to the potential, or otherwise, of morphological classification but the final points made emphasise the need for sustained programmes of reconnaissance and for the integrated approach in which aerial survey is but one component of investigation. The latter is briefly illustrated by reference to work elsewhere in Ireland.

I’m a bit out of touch with what’s going on in Ireland but Gill’s paper seems to be an excellent demonstration of what can be done with aerial photography and aerial photographs [and here I make the distinction between the act and the product that Gill does not] and, at the same time, lays down a challenge to others working in Ireland and elsewhere.

Rog Palmer


This vast book, weighing about 8 kg and slightly larger than A3, contains vertical views of the whole of England (not Scotland, Wales or any other provinces) taken for the millennium survey. At £25 it is a nice thing to own even if I can’t find a place to keep it. Printing quality is good enough to see archaeological sites such as hillforts, earthwork barrows, strip lynchets and some headlands and ridge and furrow – and there may even be a crop-marked site near Maxey (not yet checked against my mapping). Apart from its sheer size, there are two other points to complain about: the fact that maps change scale depending on urbainity (if that’s a word) – selected urbs being printed at 1:4500 while other parts are at scales between that and 1:72,000 (the ‘boring’ bits with only fields and villages! All maps are printed as double-page spreads so there is a fair acreage of England lost down the crack. However, for those of us who do not work in big photo libraries, it is useful to have the book to provide a ‘first look’ at a new area and it is also good entertainment to open a page at random and try to guess where you are.

Rog Palmer


This huge book is a ‘catalogue’ of an exhibition of aerial photos held between May 24 and 6 July 2003 in Rome. It has 1282 illustrations plus a separate binder holding a few folded maps and large photos. What follows is based on a day glancing through Chris Musson’s copy while he stayed at Palmer’s Airport Hotel. The book is considerably more than a list of exhibits and documents the history of aerial photography in Italy and then has sections on major uses – military, archaeology, cartography, photogrammetry. The bulk of the book, some 500 pages, displays and demonstrates examples of archaeological sites that have been identified on photos and their interpretation (as in making maps). Archaeologists in Italy have a long tradition of using existing photographs and this book is the best example I’ve seen of the enormous potential of photo archives. In this case they date from the 1920s (with a few earlier examples) and mix verticals and obliques as best record the features discussed. How is it that we have the cheek to go and tell them what to do with air photos …?

Rog Palmer
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