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Chris Musson: elected Honorary member, September 2005.

Helsinki 2004. Whenever Chris and I share a room in our travels he immediately takes over the table(s) and starts writing. I'm never sure what he is writing, but it keeps us out of the bar for a while.


Saint Christopher, Klaipėda 2005 (and still writing)

[pics and words: Rog]
Editorial

Thanks to all of you who did and did not contribute to the Festschrift that was presented to me at our Leuven meeting. It came as a total surprise and even if I had picked up hints (which I did not despite some unusual questions from Lidka – but then she’s always asking questions) it would never have occurred to me that I would be on the receiving end. It kept me in a daze for a while. Why me? But regardless of any reasons it is gratifying to know that some of the things I’ve done have inspired others and/or given something to build on. I won’t single out any of the contributions for comment but I’ve read the lot, some several times, and one or two have led to continued email discussion about topics that won’t go away and don’t deserve to be ignored. Being an atheoretical bloke I was surprised that theoretical aspects were predominant but I do believe that we need to think more about why we do what we do – it’s just the long words that tend to confuse me. Elsewhere in this issue is a comment that research begins by asking a question and several of us agree that it is valid to question all aspects of our aerial work in a continual quest to improve efficiency and maximise its potential. If this general approach is acceptable then there is no disgrace in abandoning something when it is apparent that there are better ways to do things. And, as I keep saying to astonished students, we must expect to be wrong at times. This causes some disbelief among our Italian students who have been taught that professors are incapable of being wrong.

On the same questioning theme it is good to see that others of us are, or have been, interested in how we see what we see. Visual perception and its relevance to photo interpretation was something that interested me during my student days, and more recently I’ve talked about this with Kenny Brophy and Michael Doneus and started reading again. It is something that may benefit from further thought, maybe further experiment, and that we could usefully develop within aerial survey. Michael, I think, now includes it in his Vienna lectures and has added some small bits to our European teaching.

I was also somewhat distressed to notice two things in the Festschrift. The first was that most of my quoted papers were from my student days – 30-odd years ago. Maybe that’s ok as it is the only time most of us get paid to do three years research, and if thoughts and papers don’t come from that it probably means the student is brain-dead. Second, and allied to that, was my own discovery, after chasing what seemed to be a key paper of mine in the 1976 Sampling BAR (a contribution that the organisers hated and labelled ‘anti sampling’), that I’ve been suggesting the same thing for 30 years – that a person looking at the ground does not seem to be the most efficient way to undertake aerial survey. And we used to say that Jim Pickering only had one theme!

This is perhaps an appropriate place to air a quote: “You could also say that if a teacher does not teach his pupils to overtake him there can be no advance.” John Wyndham 1968. Chocky (Penguin reprint 1976, 144).

I enjoy teaching – it is good to see people successfully learning to do things and perhaps I don’t do enough of it to find it a chore. And most students, given the opportunity, can teach their teachers things too as they are approaching ‘the same old data’ from a new perspective. My Cambridge teaching earlier this year was to a class of two students (for some reason uses of aerial photographs comes under Geoarchaeology and not Landscape Archaeology – but that’s Cambridge for you…) and this small number provided a good opportunity to get them thinking and talking. No learning facts, but the chance to work things out for themselves helped by a little guidance as necessary. They seemed to enjoy it too and asked at the end about the possibility of a refresher supervision before their exams. I said that could be done and that it was nice to have some student interest. To which the response was, “Oh no, we’re not that interested, we just need to pass the exam.”
Celebrations (or not)
John Hampton, founder of what became English Heritage’s Aerial Survey (for their 2006 name see Books of Interest), phoned me recently and pointed out that no one had noticed or noted that 2005 marked the 40th anniversary of the establishment of what then was RCHME’s Air Photographs Unit. John’s brief history of the APU (in Into the Sun, ed David Kennedy, 1989) gave his starting date as November 1965 from which time the Unit grew into the trundling NMP-machine that is now is. Without the APU is is likely that aerial survey in Britain (and it’s fair to say Britain because RCHME’s unit was probably the inspiration for those that were established later in Scotland and Wales) would be fairly dead by now. St Joseph and Pickering would have continued to take aerial photos but no real uses would have been made of them, and without ‘outside’ pressure CUCAP may have been closed by the university after its 1980(±) review. John introduced (or reintroduced) the concept of interpretation and mapping from air photos as an essential first step towards extracting their archaeological information. The technology in the early days (proportional dividers) made it impractical to map more than a few km squares a month but as an idea, that was later developed and mechanised, it could be argued that this was one of the most important additions to archaeology in the 20th century. Perhaps the founding of the APU will be included in the forthcoming celebrations of the 100th anniversary of those atypical tethered balloon photos of Stonehenge..?

I’m told that there is another 100-year anniversary some time during 2006 when both Bob Bewley and Włodek Rączkowski are due to have their 50th birthdays. Soon we may need a pensioners’ rate for AARG membership.

One of Toby Driver’s parting gestures as Chairman was to announce the election of Chris Musson to the small group of Honorary AARG members. Chris has been involved in AARG since the first meeting (pre-AARG) in 1981 (see AARGnews 28 for a potted history). He drafted the Constitution for us when it was thought necessary to have one and has more recently been the main organizer/administrator (as well as doing many other jobs) for the Culture 2000 ventures into Europe. More than any of us, Chris has kept working away in the background to ensure that things happen in Europe, that the relevant hierarchy [is there such a thing as relevant hierarchy?] are kept informed and educated and that students are recruited, enthused, and sometimes helped financially. When I circulated the slightly doctored photo of Chris with our small Euro flag behind him, Bob Bewley’s immediate response was ‘Saint Christopher, patron saint of travel’. And he really has been.

Meetings
AARG 05 at Leuven seemed to go well thanks in part to the precision choreography of Marc Lodewijckx, our local organiser. As usual, the papers have blended into a blur, the food and beer was ok, and there was time in the evenings for talking with old friends and those previously known only through email. It was good to finally meet two of our US members (Tommy Hailey and Marshall Faintich) and learn what they had been doing and talk about the possibilities of future collaborations. The field trip ended with a tour of the almost totally mechanised Stella brewery. It was a horrific experience for someone who lovingly makes his own beer but the seemingly endless supply of free samples was welcomed and thoroughly tested by many members.

Some time after AARG I spent a week in at cIMEC in Bucharest to do follow-up teaching with five students who were at Busteni earlier in 2005. Both events were within our Culture 2000 programme. The cIMEC course included the usual photo interpretation, use of AirPhoto, and mapping in their ArcView GIS. We had a day’s field trip through their current research area and so could see some of the sites we had been working with on APs. I was amused to see that whenever we were walking about the students kept their eyes glued to the ground searching for bits of junk while I tended to look around to see the shape of the land and any visible earthwork features. We talked about this difference in approach but their fieldwalking tradition seemed to be a dominant part of their upbringing, and landscapes or field survey may have to wait. In general the students were a good and enthusiastic group (I
had one disbeliever) and I hope that their interest can be retained and developed over the next several years. My thanks to Dan Matei, Irina Oberlander Tarnoveanu and all the students for making my stay so enjoyable.

In November, Clayday as it became known, was a day of papers about archaeology on clay landscapes. It was organized under the aegis of AARG but was not intended to have a high aerial content although more than half the papers gave at least a nod to the skies. It was attended by about 60 people of whom the largest component was from unit staff whose evaluations and excavations included some on clay. Unfortunately that lot didn’t say a word during discussion. A highlight for me was Alison Deegan’s summary of work she had done as part of the NMP for Northamptonshire. This shows what can be achieved from a starting point of NMP if a project is given sufficient time and has a sufficiently-interested person to do the archaeological reading and research that will add a bit of substance to the mapped information. Northants NMP is scheduled for eventual publication and Alison’s Clayday paper will be in the sometime-forthcoming Tempus book, Populating Clay Landscapes.

Towards the end of November there was a meeting at Klaipėda, Lithuania organised by Romas Jarockis as part of the Culture 2000 series. The theme was Aerial Photography and Coastal Cultural Heritage and it was attended by about 25 people. Romas has recently moved from Vilnius to Klaipėda where he is founding(?) a new department of archaeology with the intent to break away from the traditional archaeology and teach what he called ‘advanced archaeology’. The meeting was one of the most enjoyable that I have attended with evening meals arranged in a brewery-restaurant one night and a jazz pub the other, a field trip on one of those brilliantly sunny days after overnight snow (which, of course, covered all the things we were supposed to see but did provide ammunition for what seemed to end as a Poland v England snowball fight), and somewhere among all that we found time for two short days of presentations.

Forthcoming in 2006 are two ground and air schools. One in May at Barth (Germany) the other in July at Cirencester (England). Barth is already overbooked but there may be spaces at Cirencester for those wishing to risk an English summer. Details are given elsewhere in this issue. The proposed Foggia (Italy) school is likely to be postponed a year as both local organisers are currently finishing their PhDs.

Colour in AARGnews
This issue includes a contribution by Irwin Scollar on a freeware program he has written to help correct colour cast in old slides (that was the original reason for writing it). To show before and after photos it has been necessary to keep them in colour and those pages are by way of a printing experiment. If they work (and at the time of writing this I have not seen the final copies) it opens the possibility to include more colour illustrations in future issues but for this we will ask the author to pay. At present one colour page costs 30p per side (our normal mono printing is 2.5p) and a print run is in the region of 180 copies.

Elsewhere in this issue you’ll find some Jottings on digital photography by Gwil Owen which show (if our printing quality is good enough) that some of us have ‘misunderstood’ some things. Gwil is perhaps uniquely qualified among AARG members to pronounce on photographic things as he has spent a lifetime working as photographer in various university departments (including CUCAP and currently Archaeology and Anthropology at Cambridge). Please read his Jottings before you attend the planned digital session at AARG 2006 and discussion may begin to move in new directions.

It is good to make contact with Ireland again (p16). Former Irish members used to bring an air of practicality to some of the early AARG meetings and I remember one once saying that what we had been arguing about for the past 30 minutes they had been doing for the last five years. A lot has gone on there but I think some people tended to ignore it because there was a lot of use made of existing photos rather than someone(s) taking new ones.
Chairman’s Piece

Dave Cowley

I begin by thanking Toby for his work in the Chair over the last three years and recording the very real benefits of the AARG system of retaining the previous Chair as Vice-Chair ensuring that their experience is retained in the committee, and that stepping into the Chair is not more daunting than it should be. As I finish this piece, I am just back from Aberystwyth, where the Welsh Royal Commission hosted a joint staff conference with English Heritage and RCAHMS. The conference provided an opportunity for Toby to take Pete Horne and myself along as passengers on a flight over north Wales. This occasion exposed me to an unfamiliar landscape and an insight into someone else’s working practice, ranging across reconnaissance for new sites, routine recording of Scheduled Ancient Monuments, recording landscape context and detailed recording of known monuments. The flight itself, and discussion before and after, highlighted one of the pleasures of AARG as a group encompassing a range of approaches and perspectives, which has broaden my own views and routinely stimulated my thinking about my own material and work practices, an important component of remaining alert and fresh to ones own environment.

World-wide AARG

My first impression of AARG was of a predominance of British delegates, with a sustained emphasis on the English National Mapping Project and a smattering of mainland Europeans and the odd exotic. This emphasis is now less easy to identify and with delegates at the Leuven conference drawn from the length and breadth of Europe and also crossing the Atlantic, AARG is developing as an ever more world-wide organisation. AARG’s missionary ethos, for example in sponsoring or otherwise supporting training schools, has paid a tangible dividend in the expansion of aerial survey for archaeology across Europe. Further steps towards a formal European aerial archaeology working party have been made by Helen Winton speaking to the EAC in October 2005 on behalf of the committee, something we hope to report further progress on by September 2006. AARG also contributed to a Heritage Council of Ireland sponsored seminar titled Air and Earth: Aerial Archaeology in Ireland held in Dublin in December 2005. This was attended by Chris Musson who spoke to the ‘flying patchwork quilt’ (bedspread), a useful metaphor for the variety of approaches represented in AARG. These engagements require attention if they are to develop and opportunities are likely to extend ever further across the globe. With the end of Culture 2000 now in sight, the continuing development of AARG’s outreach role will need thought over the next year or so, looking at means of connecting with potential new constituents and extending into new worlds, while also consolidating within the boundaries of our current membership. Standing still is clearly not an option.

Outreach: Integrating Aerial Archaeology

The problems of establishing the relevance of what we do to other archaeologists, and beyond, are identified routinely in the aerial archaeology world, in particular highlighting a widespread tendency for the results of aerial (and field) survey to be accorded less importance than, for example, excavation. Effective outreach is a key to establishing the relevance of what we do without labelling it as aerial archaeology, which runs the risk of relegating it to a fringe interest. The recent AARG sponsored conference on Populating
Clay Landscapes organised by Rog Palmer and Jess Mills at Leicester University in November 2005 was a highly successful outreach exercise. This conference explored archaeology on difficult soils – difficult to dig, difficult to fieldwalk and difficult to conduct aerial survey of – and as such attracted all sorts of archaeologist, not just the usual aerial types. One ready measure of its success in engaging with ‘others’ outside the aerial archaeology world was that of the 59 delegates only 22 were AARG members. I would hope that the day will also have the less quantifiable benefits of fostering dialogue between surveyors (ground based and airborne), excavators, heritage managers and academics, where the aerial contribution forms part of a greater whole. The success of this event should encourage us to think about other subjects that would attract interest and discussion from outside the aerial world.

Keele
AARG members will be familiar with The Aerial Reconnaissance Archive (TARA) housed at Keele University in England from contributions to AARGnews and conference papers. This collection of millions of aerial photographs and their supporting records is made up of WW II Allied and German imagery primarily of Europe, and is a valuable archive of imagery that cannot be matched elsewhere. This historical material, taken as it was before the rapid urbanization, mechanization of agriculture and industrialization that has been such a feature of the second half of the 20th century, is a fundamental source for any archaeologist or landscape historian, and its potential extends to those researching the natural environment, urban planners, conservationists and so on.

The National Archives (TNA – based at Kew, England), which has responsibility for TARA, is in the process of undertaking a full review of the collection and in November 2005 I wrote to them, on behalf of AARG, to express the concerns of our membership over the future of this archive. This letter stressed the value of TARA as an archive of international importance and our concerns over its accessibility in the present and its long-term preservation. At a European level its holdings should be recognized as a significant, irreplaceable and unique component of a shared European Heritage, the importance of which can only continue to grow, provided the collection is preserved with ready accessibility, online access and an active programme of promotion. The outcome of the review by TNA is not yet known, but we may have heard something by our conference in September.

AARG Conference
In 2006 the conference will be based in Bath, in England (see page 10 for further details), and this year the committee has agreed to experiment with the format. The conference has always been an important forum for our geographically very dispersed membership to get together to talk – and this has been the most stimulating aspect of the conference for me. Informal discussion over coffee, lunch and dinner, over a beer or two, late into the night and during the field trip is invaluable, but to me this has also highlighted limitations in the format of the ‘formal’ part of our conferences – and this is the lack of time for discussion of papers with an increasingly packed timetable of back-to-back papers through a long day. For example, Rog Palmer’s paper on ‘Cost efficient data collection’ at Munich in 2004 was presented at the end of the second day of papers. This was sufficiently inspiring/annoying (delete as applicable) to stimulate the most vigorous open discussion at an AARG conference that I can remember for many years, but was ultimately frustrated
by pressing time, which curtailed the debate. AARG is a Research Group, and as a committee we want to explore mechanisms to encourage discussion and the structured exploration of live issues at the conference.

At Bath then, we propose to structure the conference around three components:

- Firstly, three or four formal ‘set-piece’ sessions of 20-30 minute papers for the following provisional sessions - using historic aerial photographs; postgraduate research; new projects; digital photography. In addition, we will be seeking papers from ‘non-AARG people’ who use aerial photographic/survey derived material in broader contexts than that of ‘aerial archaeology’ under the working title of ‘aerial archaeology in the round’.

- Secondly, a session lasting for a half day, whose purpose is to encourage debate on a selected ‘live’ issue. The issue for debate will be introduced by three or four ‘positional’ papers, with equal time set aside for discussion, both after individual papers, but also in open session after the presentations are finished. Through this we hope to explore ‘where we are/where are we going’ and in 2006 we propose a session structured around the questions of ‘Is mapping working?’ and ‘Is flying failing?’. This should provide an opportunity to examine issues such as the robustness of methodology, the reliability of survey practice, and context in/relevance to wider communities in an area of work that is surprisingly uncritical of many of its basic premises. This is aimed to be a ‘thinking’ session and its value will certainly be enhanced if delegates come prepared to contribute to debate.

- Thirdly, we wish to promote the presentations of posters as a formal part of the conference, to some extent taking the model of the Archaeological Prospection conference, with time allocated for delegates to look at poster presentations with an expectation that the author of the poster will be in attendance. This format will also allow explorations of ‘live’ material to be made to small groups huddled around a laptop.

Conferences have regularly run with approaching 30 papers over two days, and have often been oversubscribed. One of the implications of reserving more time for discussion than has been usual is that the number of formal 20-minute papers will be reduced. The call for papers asks for a preferred method of presentation (e.g. formal paper or poster) to be identified in your submission, so please give some thought as to the most appropriate method of conveying your material, though in putting the timetable together I may need to suggest changes in format. Most importantly, I would stress that we attribute equal weight to all forms of presentation and that the poster should not be seen as second class as we intend to structure the conference to ensure time for viewing and discussion.

In exploring changes in the format of the conference, there is no criticism of previous formats, and it is in the spirit of this experimentation that we will develop a variety of conference formats, and I expect that the emphasis from year to year will vary. Please let me have any comments on this proposal in the meantime.

There will continue to be an informal evening session for delegates to present recent results and thoughts, but we will be asking contributors to think in terms of 10 minutes/10 slides, rather than fuller blown contributions.
Digital Photography
It is fair to say that digital media is now established in aerial photography, but there are clearly issues that this change in media raises and some of these have been aired by AARG members. We are proposing a session on digital photography at the conference in 2006 (above), which we would like to use to explore all issues from data capture, through using images to long-term storage. As might be expected there are a variety of approaches and the exploration of these in a session may inform future development and provide a forum to air problems and discuss solutions. At RCAHMS, for example, the aerial survey programme is now fully digital following a year-long pilot project when we experimented with cameras and formats before settling on our current set-up of an Hasselblad H1, tied to a leaf-valcro 22 million pixel digital back, with additional storage, the facility to shoot direct to an Apple notebook and a CAA approved power source from the aircraft. During our assessment we looked at quality, durability (especially of batteries in winter), the implications for cataloguing, storage (500-600 GB per year), long-term archiving, meta-data and we have now to address other issues such as making digital images available to users in our public search room. This set up suits our particular circumstances, but it is only one of a wide range of equally valid approaches to digital aerial photography and its implications. While undertaking our assessment, we were conscious of others treading similar paths and developing procedures to suit individual circumstances, but may not have drawn on the range of experiences as widely as we might. The session at AARG 2006 should provide an environment to air current issues, present the range of solutions in place and outline challenges for the future. Looking beyond the conference, this session will hopefully stimulate a small working group to consolidate what has been learnt, producing guidelines and standards that can be published in AARGnews and perhaps more formally.

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Your opportunity to learn new skills...?

Three positions on the AARG committee will become vacant in September and we are seeking volunteers or nominees for the following:

AARG Secretary
AARG Meetings Secretary
AARG Treasurer

Job descriptions were given in AARGnews 30, 38-9 and further information may be forthcoming from the present incumbents.

Nominations, with the consent of the nominee, to dave.cowley@rcahms.gov.uk
* CALL FOR PAPERS *
International aerial archaeology conference

AARG 2006 BATH
Monday 11th to Wednesday 13th September 2006

University of Bath
Bath

Address for conference correspondence:
Dave Cowley
RCAHMS
16 Bernard Terrace
Edinburgh, EH8 9NX
Scotland
Email dave.cowley@rcahms.gov.uk

** Papers and posters are invited for both conference days **

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Monday September 11th. Conference Day 1 - Provisional sessions:
‘Is mapping working?’/’Is flying failing?’; New projects

Tuesday September 12th. Conference Day 2 - Provisional sessions
Using historic aerial photographs; Postgraduate research; Digital photography;
Aerial archaeology in the round

Wednesday September 13th. Conference Day 3
Field trip to selected prehistoric sites on Salisbury plain

Note: these session titles are provisional. All papers welcomed.
Offers for oral papers of 30 minutes duration (max), and poster presentations, are invited for
the two conference days – see Chairman’s Piece elsewhere in this volume for more detail.

Closing date for abstracts is 28th April 2006.

AARG HAS A LIMITED NUMBERS OF STUDENT BURSARIES FOR AARG 2006
These are aimed at supporting bona fide students who are interested in aerial archaeology
and who wish to attend. Anyone wishing to apply should write to Dave Cowley,
RCAHMS, 16 Bernard Terrace, Edinburgh, EH8 9NX, Scotland with information about
their interests in archaeology and aerial archaeology, as well as their place of study.

Annual closing date for applications is 1 July.

Aerial Archaeology Research Group website: http://aarg.univie.ac.at/
Other forthcoming events

Cirencester 2006: Aerial Archaeology Training Course, 1-9 July 2006

English Heritage’s Aerial Survey and Investigation team is organising an intensive nine-day course for an international group of participants, based in Cirencester, Gloucestershire. Students will learn how to interpret archaeological and non-archaeological features on aerial photographs and carry out small landscape analysis projects. They will also develop their interpretation skills in the air, flying from Kemble airfield; they will learn how to organise and plan aerial reconnaissance flights and how to take aerial photographs for the benefit of the historic environment.

This will be the first Culture 2000 funded Aerial Archaeology training school in Britain, as part of the European Landscapes: Past, Present, Future project. The school, and the overall project, aim to deliver a range of activities including the promotion of landscape studies using airborne remote sensing techniques.

All participants will be resident at the Royal Agricultural College near Cirencester and the accommodation and meal cost will be £650 (950 euros). Travel costs to and from the course are the participants’ responsibility. The course will be taught in English and be open to participants from all European Union countries. For more information and details of how to apply please contact aerialsurvey@english-heritage.org.uk or look at our website http://www.english-heritage.org.uk/server/show/nav.9278 (Culture 2000 Project 2004-1495/001-001 CLT CA22)

Bringing Air and Water Together – Training School in Aerial Archaeology, 1–5 May 2006 in Barth, Mecklenburg-West Pomerania

Over subscribed – no point in giving details.

Workshop: military aerial photographs and archaeology

Flanders Fields Museum, Ieper, Belgium, 19-21 October 2006

This workshop is organised within the Culture 2000 project European Landscapes. Past, present and future. It will be

Themes and programme:

Archives, Inventories and History of military aerial photographs
(Main questions are ‘where are these archives?’ , ‘what do they contain?’ , ‘which areas are involved?’ , ‘what are the potentialities for historical and archaeological research?)

Processing military aerial photographs

Further details: Birger.Stichelbaut@ugent.be
**Digital Jottings**

Gwil Owen

At Leuven last year Toby (Driver) presented his early experiences of using a digital camera. I think I summarise correctly in saying he did not fully understand the claims being made for digital, but was happy to try it out - and indeed the results were pretty good. As you would expect there was also a fair bit of background chat on the subject, often along the lines of “digital is better/wonderful”. I have to say that I thought that many of the comparisons between systems were less than rigorously argued. Fast forward five months and Rog, our esteemed editor, has just emailed me to say he is trying to compare two top end digital systems. In his words he is “Confused of Cambridge”.

Actually I don’t quite believe him. Those of us with a photographic background and of a certain age are familiar with two principles; that faster films have coarser grain structure, and therefore lower resolution, and that a bigger film always beats a smaller one, other things being equal. The good news for those younger than he and I is that, even though the technology and the physics of digital capture differ from that of film, the results in practice have many similarities.

For starters switching from film to digital capture is no different from switching films. Film has light sensitive silver halide crystals. Their number and subsequent processing defines resolution and, amongst others, colour fidelity. Digital sensors are made up of light sensitive capture sites (pixels). Their number and subsequent proc........you get the point.

Generally photography does two things; it collects information and tries to present it accurately. In our AARG world we look for detail, and we trust that what we see is true. It seems reasonable as a starting point to consider how the resolution of digital capture compares with film.

First, however, a digression. Going back to Leuven, much of the terminology of the discussions was based on what manufacturers’ blurb offers. Not a good idea. I did hear one comment that certain digital images were grain free......that they had better resolution than film. These two statements may or may not be true, but the second is not a valid conclusion from the first.

Since I shall be looking primarily at resolution here are some ground rules.

**Resolution**  The size of the smallest discernible object. This is measurable. It is objective.

**Graininess**  The subjective assessment of the smoothness of the image. It can be measured objectively, when it is called granularity.

**Sharpness**  The subjective assessment of the edge structure of objects. It can be measured objectively, when it is called acutance.

These three are often judged visually and in a comparative manner, and they do affect each other at times, but it is better to treat each separately. Advertising puff frequently chooses to emphasise one or the other as the fancy takes, and is happy to confuse the punter. For example a typical dolly bird shot might have the tag that the eyelashes are bitingly sharp. This has no relevance to resolution. Similarly the beautifully smooth skin tones may mean that resolution is incredibly good and that the skin is really very smooth, or it may mean that the processing has interpolated pixels to hide the graininess - in which case the image is smooth but false.

Advertisers lie by innuendo and omission.
Now, back to the comparison of resolution between systems. The common unit of measurement is line pairs per millimetre (lppm). This is measured in the lab using a black and white bar code with constantly reducing line and space width (Fig 1). The last visibly separable pair of lines defines the lppm. Strictly speaking resolution is also contrast dependent, but in most practical situations, and certainly where comparative rather than absolute values are wanted a high contrast test is sufficient. However, anyone can assess resolution at a desk using information readily available from manufacturers, from magazine articles or from the web. Take a simple case. The number of light sensitive sites - pixels or crystals, it matters not - defines resolution. How big are the pixels? How many therefore on the sensor? Add in then a formula called the Nyquist Criterion which says, roughly, that two sensor sites are needed to define one line. Halve the pixel count per millimetre and you get a close approximation of lppm.

Typical pixel sizes are Canon EOS 5D 8.2 microns, Leaf Aptus 75 rollfilm back 7.2, Nikon D2x 5.5, Olympus E300/ Kodak 8300CE 5.4, Sony DSC F828 2.7. Most high end camera sensors have larger rather than smaller pixels because smaller pixels equals more noise.

Silver halide crystals range in size from 0.2 to c. 2 microns.

Given the same size sensor/film area conventional film will resolve more than digital.

Try it different way. Estimate the number of sensitive sites in a three layer slide film - crystal size times film size. You will get round about 30 million. Funnily enough I and many of my colleagues can remember, but we can’t dig out the actual quote, that way back Kodak estimated that to get 35 mm slide quality from digital would require c. 33 million pixels.

Try it yet another way. Take a 35 mm slide of a test chart. Measure the resolution using a good optical system. Now scan the slide at 4000 dpi. Does this resolve all the original detail? No it does not. Do some arithmetic, bearing in mind that if you want to double the resolution of the whole area you must quadruple the dpi figure. You will find that a big dpi increase is needed. Now how many megabytes will such a huge scan produce? What a surprise, roughly the same size file that a 30 odd million pixel sensor would produce.

It is true that small influences on resolution are made by the lens and the processing, chemical or electronic. But you may take it as pretty accurate that double the resolution needs four times the pixel count, and it is the pixel/crystal count that is the major factor.

This is all very well, but it is theory. If you are not comfortable with figures it may not be convincing. I have run some comparative tests to illustrate the general ideas.

It is important to recognise that in the real world it is not the absolute resolution values of each sensor or lens that matters, but rather the resolution of the whole package as it is used in the field. Rog’s confusion was that a 16 million pixel Canon has a sensor of higher
resolution than the 39 million pixel Hasselblad, because its pixels are smaller. In practice, because its sensor size is much smaller, the larger Hasselblad will outperform it. Remember, a big film usually beats a small one.

The usual requirement in Archaeology is to produce an image of a set area - piece of section, set acreage (do I mean hectacreage nowadays?) and such like - and frequently from a set position. That image then has to show the immediate information that has been decided upon, and, more importantly, to show as much detail as possible to allow for future analysis not yet foreseen. Hence my emphasis at this stage on resolution; there are other attributes and differences which I shall mention later.

A convenient test is a section of trench a few metres long. This was photographed on 35 mm 100 ASA slide film using a Canon 24-85 lens set at 50 mm focal length (Fig 2). This is standard good quality kit. With a test chart in the middle it provides a reference resolution in lppm of the whole system. The same section was photographed with a Canon 20D (8 Mpixel) from the same position, the lens focal length being adjusted (because the sensor is not full frame) to encompass exactly the same field of view. Thirdly the same was done using a Mamiya 6x7 to show how much advantage can be gained using larger film.

![Figure 2. The test image, 35mm film.](image)

Digression again. 35 mm is the crappy end of the film sizes. Try to get a look at one of the 10x8 inch images that Linhof were producing in the late 1970s. Even if you are used to 9x9 Wild stuff these will blow your mind.

To return, figure 2 is the whole shot. Camera distance is 4 metres. This is a handy distance for working out the base lppm of the 35 mm outfit - 2 metres is recommended, but 4 gives a more typical archaeological view and only needs the maths to be doubled up. I doubt whether at a small size and on normal paper there would be any discernible difference between the three examples, so you get only the one 35 mm film one. When enlarged though differences in resolution are obvious.

What you see is not however the whole story. The 35 mm slide version (Fig 3) is not as detailed as it might be because of the scanning process. It is noticeable from figures 6 and 7 that the resolution is higher through a good optical system. Also not fully apparent is the fact that the resolution of the rollfilm image is so much better that it exceeded the test chart’s range. If in reproduction these facts are not fully visible, let me summarise. Using the original images, and being as generous as I could, the 35 mm film resolves c. 84 lppm; this scanned at 4000 dpi resolves c. 65 lppm; an 8 Mpixel camera resolves c. 40 lppm; the rollfilm resolves 140+ lppm.

My conclusion, and I hope yours, is that you haven’t a hope in hell of matching the resolution of a good 35 mm film system using digital, unless you use an over 30 Mpixel sensor. I would say too that, if you use rollfilm, keep on doing so. For my own work, archaeology in the field, studio photography and low level aerial stuff in Egypt, I will continue to use film.
Figure 3. 35mm film.

Figure 4. 120 rollfilm.

Figure 5. 8 Mpixel digital.
It is unfair to single out one aspect of digital capture, and one which shows it up in such a bad light. Nevertheless if a choice between systems is to be made, then it would be as well to take every technical factor and treat it as rigorously (and sceptically) as possible. Let me also offer a statement that you might find provocative. Digital capture does nothing that has not been thought of using conventional film. I am personally unaware of anything that digital does that has, in fact, not been done using film. What I believe AARG should be asking is in what aspects of aerial photography does digital offer an advantage. We might consider resolution, colour fidelity, noise, ease of use, costs, environment impact, archivability, weight of equipment, and many others.

Each of these is assessable in a formal way. Take colour fidelity for example. Because of the single layer construction of a normal digital sensor, the colour of some pixels has to be estimated from the results for the surrounding pixels. Does this mean that the colour information at that level is more or less accurate than that of a developed film crystal? Perhaps this matters only if the image is to be analysed at pixel/grain level, but the question should still be asked.

Noise too can be a typically contentious issue. Noise in digital capture is mostly electronic, created by the processing of the signal. It tends to be worse the smaller the pixel size. It degrades the image. For film, noise is the graininess of the image; faster films are grainier. This sets the resolution limit of a film - it does not degrade from it. There is a good argument therefore that electronic noise should be minimised, but that film noise should be retained because each grain represents real information. What is acceptable noise, and under what circumstances?

Each application of aerial imagery will strike a balance of advantage and disadvantage between systems. It would be better that each user makes an individual choice, deliberately and objectively; that is only professional.

Finally, all this is utilitarian. Is the equipment fit for the purpose? Do we have room for the pursuit of excellence?
Seminar on aerial archaeology in Ireland

Ian Doyle

On the 18th December 2005, the Heritage Council of Ireland held a one day seminar in Dublin entitled *Air and Earth: Aerial Archaeology in Ireland - Current and Future Practice.*

**Aims**

The Heritage Council hosted this one day seminar to discuss current practice in the area of aerial photographic survey and airborne remote sensing. The seminar was aimed at members of the archaeological profession, those with an interest in archaeological practice, in remote sensing and landscape studies. The seminar was intended to describe current approaches to archaeological aerial survey in Ireland and internationally, including traditional photographic survey, the use of satellite imagery, Lidar survey, as well as aerial survey source material.

It was expected that the seminar should inform a review of aerial archaeology in Ireland. This Heritage Council commissioned review of aerial archaeological survey, produced by George Lambrick, former Director of the Council for British Archaeology, argues that the contribution aerial survey can make to understanding our national heritage can be increased. It is suggested that the wider strategic value of aerial archaeology has been under-appreciated, and that the enormous potential of both archival photography and new reconnaissance has yet to be unlocked.

**Papers**

The seminar was opened by the Michael Starrett, Chief Executive of the Heritage Council, who made a call for the greater incorporation of aerial photography into the analysis and protection of Ireland’s landscapes. This was followed by a session chaired by Prof Gabriel Cooney of University College Dublin. The first presentation in this morning session was by Michael Moore, archaeologist with the Department of Environment, Heritage and Local Government. Michael told how the Archaeological Survey of Ireland has spent the last twenty years systematically inspecting and recording on the ground every monument throughout the country. It is now feasible to add dedicated aerial photographs to those records in a GIS format. This is particularly the case with earthworks where oblique aerial photographs are invaluable in recording the condition of monuments and their vegetation; and any potential threats. This paper was followed by Markus Casey who described the aerial recording of coastal promontory forts around the coast of Ireland. On initial field work on the west coast a 60% increase in the number of recognisable promontory forts was noted. Aerial reconnaissance along the remainder of the coastline revealed a further 105 such monuments, increasing the total known by 77%. Such an increase in numbers was seen equally in counties with archaeological surveys already published and in those without, showing the value of conducting systematic aerial surveys. The morning session was completed by Richard O’Brien of Waterford County Council Roads Design Office, who presented some case studies from projects in the south-east. The case studies included examples of aerial surveys taken at the different stages of road development.
After a discussion and coffee, the late morning session opened under the chairmanship of Prof Terry Barry of Trinity College Dublin. The initial paper from Niall Brady and Brian Shanahan described the Discovery Programme’s (the State sponsored archaeological research institute) Medieval Rural Settlement Project. This aims to investigate the organization of the rural landscape during the later medieval period, c. 1100-1650 AD in a Gaelic lordship in north Co. Roscommon. This part of the country is especially rich in the remains of ancient field boundaries and related relict features of land management. In order to better assess the possibility of untangling the medley of exposed features, an aerial photographic survey was commissioned in 2005. The process of digitizing the data recorded on the photographs has begun, and is beginning to present highly detailed landscape models.

Stefan Bergh, of National University of Ireland, Galway, then described the aerial survey of the exposed limestone plateau of Mullaghfarna, Co Sligo. This site, with its large cluster of circular enclosures, has been one of the most enigmatic sites in Irish prehistoric archaeology ever since it was first recorded in the early twentieth century. The site, which measures c. 200 x 300 m, consists of some 150 stone built enclosures/hut sites situated directly on the karst limestone pavement. As part of an ongoing research project, an aerial survey of the plateau was undertaken using digital photogrammetry. The main aim of the survey was to create a plan of the entire area, where individual stones in each enclosure/hut site could be identified, and thereby enabling a detailed interpretation of each site. Another important aim with the survey was to create a base for detailed 3D modelling of each site, but also to model them into their wider landscape context. Gillian Barrett of the University of Wolverhampton completed the morning session with a description of a 10-year programme of archaeological air survey in the fertile arable zones of Ireland. The potential of a systematic, cumulative pattern of aerial survey was explored through case studies within the arable zone of southeastern Ireland where a restricted recorded field archaeology has been transformed both quantitatively and qualitatively through yearly aerial survey.

After lunch the seminar resumed with a ‘technological’ session chaired by Brian Lacy of the Discovery Programme. Martin Critchley of ERA-Maptec described the integration of high resolution satellite imagery with historical aerial photography as well as recent applications of satellite based remote sensing to archaeology and landscapes in Ireland and elsewhere. This was followed by Colin Shell, of Cambridge University, outlining the basics of lidar (lidar – light detection and ranging,). The presentation illustrated its use in two landscapes, one predominantly arable (Stonehenge WHS, UK) and the second largely improved grassland (Loughcrew, Co Meath), showing how the lidar not only detects new sites, but also enables a highly detailed digital analysis of inter-site landscape relationships. The results of lidar in this area of Co Meath, which is well known for the stunning setting of the Neolithic passage tomb cemetery, were very impressive. Continuing the theme of lidar, Hugh Mangan of Ordnance Survey Ireland, then presented details of a new lidar service provided by OsI showing details from Tulsk, Co Roscommon where a pilot project was completed for archaeologists involved in road design.

The final session of the day, chaired by Ian Doyle of the Heritage Council, commenced with Chris Musson of the Aerial Archaeology Research Group. Chris commented on the
wide range of approaches towards the practice and uses of aerial archaeology in Europe, drawing on experience gained through the AARG ‘network’ and the current Culture 2000 scheme. The last paper of the day was by George Lambrick who outlined the history of aerial archaeology in Ireland (which dates from the 1930s), as well as the main archival holdings and their accessibility. The cost effectiveness of aerial archaeology and the need to promote and develop clearer standards, including more investment in teaching was highlighted alongside the need to develop a better organisational context to sustain key activities involving aerial archaeology.

Comment
There was a general consensus that wide range of useful projects involving aerial archaeology was underway in Ireland, many of which had produced highly significant results. Special thanks go to Chester Beatty Museum, Dublin, for the use of their venue, to the speakers, chairs and attendees for participating in what was a hugely informative seminar.

The review document, entitled *Air and Earth: Aerial Archaeology in Ireland*, commissioned by the Heritage Council from George Lambrick, is available for comment on the Heritage Council website (http://www.heritagecouncil.ie/archaeology/index.html)

The above web site makes an excellent presentation of work in Ireland and includes quite a lot of downloadable stuff including Lambrick’s paper with its interesting ‘definition’ of aerial archaeology [Rog].
Honorary membership for Chris Musson MBE

At the 2005 AARG Annual General Meeting in Leuven, Belgium, the committee had the pleasure of nominating Chris for an Honorary Membership, a motion which was unanimously approved by the assembled membership. The Honorary status is chiefly in recognition of his tireless work for the cause of national, and international aerial archaeology, at which he worked for over three decades and still keeps up a breathless pace. Chris has been at centre, or at the start, of so many major movements in modern archaeology (as co-founder of the Rescue Archaeology Group in the 1970s, and a founder member of the Institute of Field Archaeologists), major projects and key developments in European aerial archaeology that it would be difficult to list them all. On a personal, as well as a professional, level he has advanced contacts in the aerial and archaeological worlds from the Baltic to the Mediterranean. Arguably the fruit of his labours to date have been crystallised in last year’s In Volo Nel Passato with Rog Palmer and Stefano Campana, a massive tome on aerial archaeology in Italy. Hopefully the Honorary status will not encourage him to rest on his golf clubs. This photograph dredged from the National Monuments Record of Wales archive shows a younger, and hairier, Chris from the summer of 1990 at Shobdon Airfield. It proves the historical worth of ‘me and my aircraft’ photographs even though they have little archaeological merit! Congratulations Chris, from all the membership.

Toby Driver
Colour correction and colour cast reduction

Irwin Scollar

Almost all color transparency films, color print papers and color negative films use a multilayer subtractive colour construction similar to that shown here. The uppermost layer contains a yellow dye whose density is proportional to the amount of blue light, the middle layer has a magenta dye with density proportional to green light, and the lowermost layer contains a cyan dye with density proportional to the red light during exposure. A yellow filter layer prevents blue and ultra-violet light from reaching the two lower layers. A positive orange masking layer is also usually present in modern colour negative films to correct for imperfections in the response of the cyan dye. All colour dyes have limited lifetimes since their molecules break down under the influence of temperature, light and reaction with adjacent materials in the layers in the film. The cyan dye which is responsible for the red colour in an image was especially unstable in films manufactured prior to new developments in the mid-1980's.

Henry Wilhelm, in his monumental work on the stability of colour images, classifies the effects into several different categories. The graphs shown below are taken from his book with permission. In Chapter 5 he writes:

“Once a color photograph has been properly processed, the most important factors in determining the useful life of a color film or color print are the inherent dye stability and resistance to stain formation during aging that have been built into the product by its manufacturer. While it is true that even the most unstable materials can be preserved almost indefinitely in humidity-controlled cold storage, only a small fraction of one percent of the many billions of color photographs made around the world each year will ever find their way into a cold storage vault.”

CastCorrect has been written to aid in dealing with the majority of images which have not made their way to an archival vault. It is an imperfect solution to the problem, since there is no way of restoring information which has vanished utterly, but it does help if there is enough left for the methods offered to be reasonably effective.

1) Dark fading
which affects each dye separately. Here is an example which shows the deterioration of the cyan dye with time on several different films and papers:
2) Dark staining

produced by deterioration of the residual otherwise colorless dye couplers in various films and papers:

Wilhelm writes:

“Dark fading of course is not caused by darkness (light fading, on the other hand, is caused by light and UV radiation). Dark fading simply refers to the fading and staining that take place in a color material during storage when light is not present. Given the inherent dark fading stability characteristics of a particular material, the rate of dark fading and staining is determined primarily by the ambient temperature and, usually to a lesser extent with modern materials, by relative humidity. Air pollution and contamination from unsuitable storage materials can also play a part in the deterioration of color photographs, but these factors are usually much less important....Improper processing of
color materials can also impair image stability; for example, use of non-recommended, exhausted, or contaminated chemicals, inadequate washing, omission of the proper stabilizer bath when one is called for, and so forth.”

“The principal cause of yellowish stain formation in Ektacolor and other types of chromogenic prints with similar magenta dye couplers has been attributed by Robert J. Tuite of Kodak and others to discoloration of unreacted magenta coupler; the amount of magenta coupler that remains after processing is inversely proportional to the amount of magenta dye present in an image....”

“Historically, stain formation during dark storage has been a problem with all chromogenic materials except Kodachrome. (From its inception in 1935, Kodachrome has been an ‘external-coupler’ product in which the color-forming dye couplers are placed in separate cyan, magenta, and yellow developer solutions, instead of being anchored in the film emulsion itself. After processing and washing, no unreacted couplers remain in Kodachrome; for this reason the film remains completely free of stain, even after prolonged storage under adverse conditions.)”

Light fading due to exposure of an image to light, shown here for a representative material artificially aged with strong illumination:

Wilhelm writes:

“Actually, the slow but inexorable chemical processes involved in ‘dark fading’ and ‘dark staining’ continue whether or not a color photograph is exposed to light on display or during projection. Light fading is a separate process altogether. When a color photograph is exposed to light on display, both light fading and dark fading occur simultaneously. The fading and staining that afflict a photograph over time are in fact a combination of these two basic types of deterioration.”
“Light fading and dark fading also differ in the way that they affect the appearance of the image. In light fading, a disproportionate loss of density occurs in the lower densities and highlights. Visually dark parts of an image can remain more or less intact while lighter areas can become totally washed out. With modern materials, light-induced stain formation (distinguished from light-induced fading) is of less concern when prints are displayed than is staining when the prints are stored in the dark. In dark fading, highlight detail is not lost but an overall color shift occurs, caused by the cyan, magenta, and yellow dyes fading at different rates, and is exacerbated by an ever-increasing level of yellowish stain. In addition, there is both an overall loss of contrast and a discoloration caused by stain that is most objectionable in highlight and low-density areas.”

“.... A further feature of dark fading versus light fading is that a dye with good stability in the dark may be comparatively unstable when exposed to light. In Kodak Ektacolor papers, for example, the magenta dye is the most stable of the three dyes in the dark, but is the least stable in light under typical indoor display conditions.”

“Because color negatives are not viewed directly, but rather are used to make prints, analysis of color negative fading (and the ramifications of d-min stain or density losses) in the future will be based on the effects they have when printed. A certain amount of negative density loss and color imbalance can be satisfactorily adjusted for during printing, but more severe negative deterioration cannot. Historically, both still camera and motion picture color negative films have had particularly poor dark fading stability - the logic being, one might suppose, that most color negatives are printed soon after processing so that fading of the negative in later years will not matter in most cases....”

“Kodachrome clearly is the most stable transparency film in dark storage; the film is especially outstanding in terms of its total freedom from yellowish stain, even after extended aging. In spite of Kodachrome's unequaled dark storage stability, it has the worst projector-fading stability of any slide film on the market.”

As can be seen from the diagram below, the changes in density are also a function of the original starting density, so that appearance varies considerably from image to image. Correction methods must adapt to these conditions.
Dark fading and staining usually produces a yellow-orange cast which CastCorrect can reduce with several different methods.

Light fading usually produces a blue-green cast along with an overall lightening of the image which CastCorrect can reduce with the ACE method.

In addition to defects due to age and dye changes, gray cast due to fog or poor visibility can also be reduced with ACE and Sharpen.
The features and functions of CastCorrect cover a variety of methods for dealing with colour problems.

A fairly simple method used in all digital cameras is to set the white point of an image automatically to that of the lightest area of the image or to let the user choose a variety of illumination which can then be compensated more accurately. Choosing this option shifts all the colours of the image so that a colour cast which is usually caused by an incompatibility between film or digital camera setting and the illuminating light is reduced. There is no easy way to do this with a scanned image. Since the algorithm for the choice of the optimum white point is rather arbitrary, the point can also be chosen manually in the original image zoomed to whatever size is convenient.

A similar idea is to set the average gray point of an image automatically. This correction is related to a white point correction, but it corrects for casts which are caused by factors other than the colour of the illuminating light. Sometimes, simply setting the contrast range of an image to the full range available without affecting the colour balance may offer dramatic improvement.

One of the most effective methods of colour cast correction is the Automatic Colour Equalization (ACE) algorithm of Rizzi et al. This is the slowest method, but the results are usually very impressive. Yet another technique greatly enhances detail in the highlight and shadow regions of the picture using a modified Retinex algorithm (see references), leaving the middle tone range unaffected and increasing the saturation of the colours in the darker and lighter parts of the image. This is especially useful when treating RAW images from digital cameras which offer greater dynamic range than the usual 256 levels of each colour in cheaper devices.

It may also be useful to sharpen a blurred image without introducing computational artefacts into large areas of constant colour before any colour processing. Doing this after colour compensation may be less satisfactory.

Should all else fail and the image on an old colour slides stays persistently in the ‘red goo’ state, then converting to a grayscale image may be the only useful solution.

In addition to the automated functions, manual ‘tweaking’ of each colour component separately for the brightness and contrast of the individual component, as well as a semi-automatic ‘tweak’ which reduces the orange cast characteristic of old paper prints with a single operation is also useful for a final ‘touch-up’.

All the treatment methods are deliberately made cumulative, so an undo which restores the previous state of the image and the settings of all the parameters to their previous values is required. An unlimited number of such undo operations allowing one to back-up to the last satisfactory state.

These functions are also available in AirPhoto version 3.20 and later, so that it is not necessary to exit AirPhoto to use them.
The Colour Panel

The central control panel for manual, semi-automatic and fully automatic operations is displayed after an image has been loaded. It shows histograms of the counts of red, green and blue pixels from the original image and a number of trackbars, option buttons and a check box.

With no correction applied, the left and right images will be identical, and all trackbars will be at their default positions. You can modify the brightness and contrast of each colour component separately. For example, with the brightness button (default), the colours may be shifted independently. The change will be applied immediately to the right image. You may also change the contrast of each colour separately either prior to or after a brightness change. It may sometimes be necessary to reduce the brightness of a colour after increasing its contrast.

If you wish, you may modify all three colours simultaneously by checking the RGB box and dragging the lowest trackbar in the desired direction. If you wish to reduce yellow stain manually, you may drag on the semi-automatic trackbar at the bottom of the colour panel. It is also planned to offer manual modification of global colour saturation and tint using a similar interface.

If you apply any of the automatic options from the main toolbar, the effect on the histograms will be shown when the operation completes. If you apply a subsequent automatic treatment step, in the case below, an automatic setting of the gray point, the result will also be shown immediately.

References:

The most authoritative work on the colour instabilities of films and papers is:

The full 20 chapter volume is available for downloading in PDF format from the www.wihelm-research.com web site without charge.

This book is essential reading for anyone who has to deal with older colour pictures. Henry Wilhelm is hereby thanked for granting permission to use the graphs in the first part of this help file and to quote from his book.

Some of methods used in CastCorrect are described in:


Acknowledgements:

Fabrizio Di Vittorio of HiComponents, Ladispoli, Italy is hereby thanked for implementing and adding a fast version of the ACE algorithm of Rizzi et al. and a modified version of the Meylan-Süssstrunk method to the HiComponents package at the author’s request.

Rog Palmer of Air Photo Services, Cambridge, UK, is hereby thanked for testing the programme and making suggestions for its improvement.

Thomas Niemann, Portland, OR, USA, tested the programme and made suggestions for improvement of the user interface.

CastCorrect may be downloaded and installed on any Windows PC with modern hardware. It is in the public domain and may be freely copied.

It can be found at:

http://www.uni-koeln.de/~al001/castcorrect.html

or

http://super5.arcl.ed.ac.uk/baspmirror/castcorrect.html
Your help wanted
Anthony Crawshaw

We are starting a small project to see if we can better apply the UK Soil Moisture Deficit (SMD) data to the prediction of “good” areas for aerial survey in pursuit of crop marks. (If you are reading this it means that our editor has got over his apoplexy, at finding me apparently pursuing crop marks for their own sake, enough to publish this piece........)

You will probably be aware that there has been a crude method of predicting worthwhile areas for flying in use for some years, namely when the SMD exceeds 100 mm.. In order to be able to refine this we need your help, by letting us know what areas of the UK you remember as being particularly good, and when. If you feel that there was some particular factor that helped, e.g. ‘six weeks of dry weather in April/May’, then please include that also. Perhaps we may be able to work out why Bedfordshire was so wonderful in 1996, or indeed if it really was!

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YO1 9SN     acrawshaw@yorkarchaeology.co.uk

...and another forthcoming event

Aerial archaeology and maritime landscapes
Seminar and workshop in Tallinn and Saaremaa (Ösel), Estonia
26–29 October 2006

A seminar and workshop have been arranged in order to introduce the value and opportunities for the use of aerial photography in the research of maritime landscapes, and to discuss the methods with colleagues from other research institutions from around the Baltic Sea. The seminar will be open for other audiences, for the students of Tallinn University and Tartu University, as well as for the general public. The workshop will be arranged for discussing the research methods and further perspectives in situ, visiting the sites and landscapes of interest on the island of Saaremaa.

The meeting is organised by the National Heritage Board of Estonia and the Department of Archaeology of the Institute of History of Tallinn University (Project European Cultural Landscapes). Further information from: riin.alatalu@muinas.ee or armin.rudi@muinas.ee or ants.kraut@muinas.ee – probably in that order.
Signposts for GX – looking for prints

Chris Going

When I saw GX archives\textsuperscript{1} in the UK for the first time, I was astounded and troubled. It was towards the end of a late spring day in the dank basement of Keele Hall. Nobody was in the rooms around me, The only noise was noise I made as I dragged aside overfull tea chests stuffed with sortie boxes, cover plots, maps, and heaven knows what else. And every chest contained treasures. One of these archival Howard Carter moments I remember very clearly. Inside one such chest sat a GX print box. Opening it, I saw small vertical images of a village, probably in Belarus. Every building in it save for the church had been burned down. I turned it over and on the back in blood red lettering was stamped Geheim! I put it back and looked at the box again wondering where it was. The box was endorsed ‘Unlocated’. A true postcard from Hell. In the next room, thin rust plumes spread across the floor from the metal racking housing Allied reconnaissance film marked where floods had been. Bays were piled high with maps. Pipework for a fountain traversed the ceiling. As I locked up I wondered just how things had got like this.

Almost ten years later that sense of amazement and annoyance remains. Things have improved in some areas but finding one's way around this priceless inheritance – the precursor to restoring it to utility, remains a hit and miss affair. In 2000 I wrote a brief tour d'horizon on the subject for the benefit of an archaeological audience (Going 2002), describing the various classes of document which go to make up the various GX captures -prints, target graphics, maps, anaglyphs and so on. Wlodek has since chronicled his experiences (Rączkowski 2004) but it’s high time I wrote more about it. And the most useful place to start is to try to answer the most basic question of all – where does the researcher go to find cover of their area of interest – Keele, or the United States? For the moment, I shall leave mosaics alone and concentrate on runs of prints.

The table tries to answer the question. It’s not much to look at but to create it required first making a full index of the surviving GX sorties in the United States, which I managed after several visits and then making a full index of sorties preserved in the UK. Some 11,228 GX frame runs exist, of which some 10,549 feature in this list. Once it was established who had secured the original sortie, any GX number appearing in the 'other' archive must have been ‘selected’ for duplication under the post war ‘Copycat’ programme, when the UK and the US duplicated interesting bits of each other’s holdings. So, Copycat material will be copies. Otherwise it will be mostly original.

\begin{tabular}{|l|c|c|l|}
\hline
\textbf{Country/Region} & \textbf{GX Runs} & \textbf{of which UK holds} & \textbf{Origin UK held} \\
\hline
Albania & 0029 & 0011 & All Copycat \\
Balkans & 0025 & 0023 & All Copycat \\
Belgium & 0000 & 0000 & N/A \\
Bulgaria & 0065 & 0034 & Approx Half Copycat \\
Cyprus & 0019 & 0000 & Unselected \\
Czechoslovakia & 0216 & 0139 & All Copycat \\
Dodecanese Islands & 0008 & 0001 & Copycat \\
Egypt & 0108 & 0010 & All Copycat \\
Eire & 0000 & 0000 & N/A \\
Finland & 0223 & 0102 & Half Copycat \\
France & 0049 & 0000 & Unselected \\
French Africa & 0089 & 0025 & All Copycat \\
\hline
\end{tabular}

\textsuperscript{1} GX: captured German Air Force reconnaissance photographs and associated documentation.
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<tr>
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<td>0062</td>
<td>0026</td>
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The table immediately indicates just how much imagery was seized of the USSR. Its geographical extent is indicated in the little block diagram published in Going 2002. I have begun to pull apart cover of Belarus, Ukraine, and Estonia, Latvia and Lithuania, and the parts of Germany which are now in Poland, the parts of Poland which are now Belarus, etc, as well as Germany and Austria, Crete, the Czech republic, and so on, but this will be a fairly protracted process given that I am fairly busy elsewhere. However the table is a fairly good, basic guide to what is where, though doubtless some of the numbers will change a bit.

More detailed finding aids are available at each place. In the US the mainstay of the Coversearch system are degree square cover plots on transparent overlays, while Keele itself has dyeline overlays on opaque paper, bound in Green binders keyed to the 1:300,000 Map sheets. It also has some other Military mapping which should give the researcher a kleg up once they are there. There is also, somewhere at Keele, in a Blue Plastic index, a print out of GX which gives degree square cover. It could be photocopied. And when once day we have a proper system in place and the stuff is husbanded well at last, who knows, perhaps I will find that ‘lost’ village.

References


2 Patron: a major addition to the UK collection made in 1946 (Going 2002, 24).
Soilmarks
(defn: not crop marks, not crop-marks, not cropmarks)

The Theban Mapping Project
This project is preparing a comprehensive archaeological database of Thebes. I draw your attention to it because of its use of a (correctly orientated) ‘giant aerial photograph’ via which you can navigate among the sites and access plans and other information about tombs, etc in the Thebes area. Maybe soon we’ll have the English Mapping Project similarly available?
http://www.thebanmappingproject.com/

New 3D viewing technology
In November 2005, the GeoInformation® Group announced the launch of CR iview™, a revolutionary solution for viewing air photos in 3D without the need for glasses or expensive hardware. This uses a standard PC environment with new technology to view aerial photography in true 3D without the need for polarised glasses or a high-end photogrammetric workstation.

The press release gushes considerably but, if I understand it and conversations with Chris Going correctly, it will work with verticals, obliques and ground photos if they are taken appropriately (ie oblique stereo pairs from a fly-past rather than in orbit). But before you rush out and buy a lorry load….

The technology behind CR iview utilises the existing Cities Revealed image management software, CRViewer™, that comes packaged with Cities Revealed 2D photography – existing images or any that you care to commission. With the help of a specially designed screen, it provides users with the option to toggle between 2D and 3D mode at the simple touch of a button.

So, what about the other few million photos that we may like to look at? According to Chris Going there are two options: someone might come along with two frames and want a stereo model. The GeoInformation Group would make one for them. Or, anyone with a sufficiently high programming ability might create a stereo model themselves and view that on the screen. To find out more, visit www.citiesrevealed.com
Books of interest?

*Program of the Second Round Table on Archaeology and Geoinformatics.* Moscow 2005. Un-numbered CD. Price not given.

At one of the meetings last year Wlodek, acting as postman, gave me a CD of this Round Table that had been sent from Dmitry Korobov who some of you may remember from Leszno 2000 and a training week sometime before that (I think…). Contributions are divided into four themes: GIS applications, remote sensing, geophysics and supplementary. From the aerial point of view it is interesting to see what has been achieved using existing photos and satellite images. Papers on the CD are all in Russian but have English summaries. Each paper is in its own directory (folder for the young) which includes copies of illustrations including some PowerPoint presentations and some movies of visualisation fly-arounds. With patience it is possible to work with the summaries and see the relevant pictures. This is an excellent way of publishing contributions to a workshop-like meeting and is to be encouraged unless, in the west, paranoia about copyright issues may mean that nothing of this kind is possible. For further information, and probably copies of the CD: dkorobov@mail.ru

Rog Palmer


This nasty-smelling book (the ink, the paper or a combination of both, but which seems to lessen with time) contains papers given at the conference held at Ghent University in December 2003. Its publication 18 months later has been reasonably rapid. At this international conference most papers have been written from an ‘aren’t we wonderful’ viewpoint and add little of archaeological weight. As may be expected at a conference summarising 100 years, many contributions simply show what work (which usually means taking aerial photographs and/or mapping) has recently been undertaken and put this in its local historical context. The book seems to be in three parts: History of AA; Aerial photography, satellites and remote sensing; and New discoveries and research in AA. But among all this data collecting and sorting there are a few papers that deal with archaeological problems that can be aided by using air photos.

Kenny Brophy has a thought-provoking paper on the European Neolithic – a theme that he enlarged in AARG 2005 and which seems likely to need putting on hold for many years until research projects begin to use the mass of aerial data that has been collected and provide some factual feedback. Battlefield archaeology – something that may be unavoidable from the air over Belgium – is the subject of at least two papers (de Meyer; Stichelbaut) and makes use of historical photographs from WW1 and WW2. Włodek Rączkowski updates his own battle against traditional archaeologists in Poland in an amusing medically-themed paper. Use of CORONA photographs and other satellite images was a newish thing at the time and is the subject of three papers (two of which seem to have the same introduction – one in French, the other in English!). Elsewhere ‘technical’ papers range from uses of LIDAR, a comparison of assorted satellite images and oblique aerial photos, and the latest developments of John Haigh’s AERIAL program. Finally about one-third of the book is dedicated to new discoveries,
etc in which assorted nations present a wide assortment of ‘results’ among which there may be something to interest some of you.

I imagine that other specialist groups publish collections of their conference papers but I wonder just what impact these – and the present Ghent report – are likely to have within archaeology or even within our aerial speciality. Perhaps I’ve been around for too long, but there is an awful lot of ‘reinventing the wheel’ going on and being published as ‘new’ work. Conferences may be the place to air such views and stimulate discussion but the majority of conference presentations (especially annual conferences) ought not to be published or even considered as publishable material. Isn’t the purpose of a conference to provide an illustrated summary of something – an idea, new research, somewhere from the air, somewhere from NMP, etc – which is more of a snapshot than something to frame and keep? Do they actually add much that we really need or want to know? And can most conference speakers be bothered to write up what may be no more than a few key points on a sheet of paper into real words? Publications of this kind may help the editor score points in the periodic university assessments but I do wonder what the target readership is and have to ask whether archaeology, or even ‘aerial archaeology’, needs any more of these?

Rog Palmer


This short paper, apparently the first of a series, contains details of the pit-defined cursus at Reeedieleys and other features in its immediate environs. There are some thoughts about the effects of the overlying rig-and-furrow on the survival of Neolithic features and an interesting paradox in which a palaeochannel and area of higher ground are both visible as dark-toned crop. The concluding paragraphs argue for the necessity of repeat visits to supposedly well-known areas.

Rog Palmer


Otto wrote: “The little book I made for an archaeological/historical society in Baden-Württemberg in the southwest of Germany. That is why most sites shown are of that region. The society supports monument protection and archaeology, helps at excavations etc. The booklet is number one in a series dealing with various methods in archaeology…. So it was not really made for teaching, rather to offer an introduction into the method.”

And as an introduction to aerial photography and how things show the book looks excellent and is full of drawings and photos to illustrate various phenomena. Usefully, the ‘relief’ section includes a drawing of a rampart and ditch in its original form so that people new to the subject can see how things began that now may be just a bump or band of green cereal. The cropmarkology is followed by some aerial underwaterolgy [try doing that] and sections on aircraft, navigation, film, etc.
I don’t know how easily available the book is outside the Baden-Württemberg area so all
enquiries to Otto please.

Rog Palmer

*Research News: newsletter of the English Heritage Research Department*. Issues 1 and 2,
Summer 2005 and Winter 2005-06. ISSN 1750-2446. Free from EH.

It was news to me that EH undertook research. This Newsletter supersedes the old *CfA News*
and so can now include the work of staff based in all its offices. Issue 1 is notable for its
inclusion of a vertical photograph with shadows falling downwards – a first (I think) for EH –
in one of the several short articles that includes an aerial component. Issue 2 includes some
very high-resolution geophysics on one of the Danebury environs sites and has placed this
within new mapping from APs of a wider area. It is interesting for me, as compiler of the
1980s Danebury area survey, to see the changes in interpretation and mapping that a new eye
and possibly new photos have allowed. A nice demonstration of the subjectiveness of photo
interpretation. Issue 2 also indicates where some research within EH is clearly needed as it
includes an air photo of Mount Pleasant, Dorset in which half the site is in bare soil, half in
what looks like stubble yet the archaeological features are called ‘cropmarks’. It seems that
the Aerial Survey teams need to do a bit of reading and research to learn about soil marks.
Otto’s book (above) could help.

*Research News* may have been conceived to promote EH’s newly born ‘Research Strategy’
even if the contents of the first two issues seem to describe the normal recording and
conservation work of its staff. Out in the real world (and in universities), research begins with
a question and devises methods and analyses that may provide an answer to that question.
There is a notable absence of questions in *RN*, just some introductory sentences in current
EHese. However, the short articles do help the outside world know how its civil servants are
spending our taxes and *RN* is welcome for that. But research within EH? I’m waiting to be
convinced – and the *Research themes and programmes* that preface Issue 2 do not provide
much credibility (eg ‘opening doors’, ‘making friends’, ‘keeping it safe’). No, I think EH is
doing what it has always done but perhaps has spent a small fortune on image consultation or
whatever is currently trendy to facelift a creaking body. There is some interesting stuff in *RN*,
indeed, it was pointed out to me that EH are now doing things I suggested about 10 years ago
so I ought not to complain. But I do feel that if the newsletter was called *EH news* it wouldn’t
be breaking the trade descriptions act.

On an aerial note is was amusing to see that Aerial Survey has changed its name again and
now is either AerS&I (MacLeod) or AerSI (Winton). Dave is obviously trying to avoid
people like he and I automatically calling it arsey, Helen may have more misplaced faith in
boykind. That irresistible comment aside I would welcome any explanation about the
research component of the work that AerSI now does and how this may change output
generated by NMP and other projects. The pages of *AARGnews* await your contribution(s).

Rog Palmer

I only saw this a day before AARGnews was put to bed, but from a quick glance this seems an unusually easy-to-read thesis. Perhaps they’ve done away with all the academic la-di-dah in Finland? It’s a subject that won’t be for most of you, but there are some members who are likely to be interested. The following is taken from the author’s abstract.

Even though computer vision and digital photogrammetry share a number of goals, techniques, and methods, the potential for cooperation between these fields is not fully exploited. In attempt to help bridging the two, this work brings a well-known computer vision and image processing technique called foveation and introduces it to photogrammetry, creating a hybrid application. The results may be beneficial for both fields, plus the general stereo imaging community, and virtual reality applications.

Foveation is a biologically motivated image compression method that is often used for transmitting videos and images over networks. It is possible to view foveation as an area of interest management method as well as a compression technique. While the most common foveation applications are in 2D there are a number of binocular approaches as well.


A review of good (and not so good) things on Google Earth relevant to (mostly upstanding) archaeological features. The CSA Newsletter is worth keeping an eye on. Thanks to Irwin Scollar for spotting this before I did!

And two offerings from Wales, also late arrivals – but blame that on the AARG committee meeting, 23 February 2006….


Which includes a report from Toby Driver on aerial survey in Wales and a nicely arty photograph of Llandudno Pier. Also of interest may be the note on mapping and 3D models by Brian Malaws.

Toby Driver. *Seeing Wales from a Cessna*. Planet: the Welsh Internationalist, issue 175 (Feb/March 2006). ISSN 0048-4288. £3.75.

Perhaps a slightly obscure place to expect to find 9 well-illustrated pages (plus the cover photo) about aerial survey but that makes it an excellent place to reach a broad spectrum of ‘normal’ people. At a time when some of us have been asking how we can reach a wider archaeological audience, Toby has shown a way of reaching the masses. Well done Toby – either for volunteering to write in the first place or for being persuaded to do so.
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Notes, jokes, letters to editor....

Some of you may have fun with this mixture of anaglyphs and cross-eyed stereo pairs

http://www.3dphoto.net/stereo/world/world.html