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It is some 10 years since I was last in the Wessex area and there has certainly been a change in the presentation of some of the more major sites – good old EH (and the National Trust). However, it was saddening to see many areas that used to retain traces of celtic fields have now been ploughed blank – although they may be visible still from the air. It adds importance to our photographic record of these features (plus RCHME inventories for Dorset) and suggests to me that future reconnaissance ought to make a point of photographing virtually any traces of ancient and medieval cultivation (you know, that stuff most archaeologists find boring) as these ought to represent an important component of any future attempts to try and study settlement patterns, demography as well as local agricultural practices.

As to AARG itself – I must repeat the comment that has been heard so often recently that we need time to talk to one another and for discussion of presentations. This is perhaps of special importance to those visiting colleagues from Distant Europe [Otto, is that better than Eastern Europe?] who have those few days to begin to make contacts with us (and vice versa for those who want to make foreign trips). In AARG 95 practically the only way of having a chat was to miss presentations and that doesn’t seem to reflect good (or useful) planning.

I have been encouraged by the editors of *Archaeological Prospection* to ‘thump the drum’ about publication in that journal. I attended their first conference the week before AARG 95 and was slightly
disappointed (although not at all surprised) to find that, in general, ‘prospection’ equals ‘geophysics’. It is up to the aerial contingent to remind these a whole new world awaits them as a result of aerial reconnaissance. Some of you must be getting up to something out there, so why not tell a broader audience than just AARG members. I would imagine that contributions on inter-tidal work and investigation into the increasing uses of satellite imagery would be well received by the editors. Maybe even something on the NSP would help bias the present close-up view of archaeology!

I met Ivan Kuzma and Elena Hanzelyová at the Archaeological Prospection conference. In 1994 at Potsdam they had given a talk on the work of their Slovak Aerial Archaeology Group and this was updated for AP and given again at AARG 95. Between the two meetings they toured around and came one day to visit APS Cambridge. Our chatting touched on flying and the problems of control points – apparently my large Fenland fields are tiny in comparison to some of those over there – and then it emerged that the usual Slovak flying height was 100m. Can this be the reason that sites discovered are followed up by geophysics? Navigation – Elena’s job – must be an absolute terror although things obviously work for them. The Merry Christmas card from them also wished a ‘droughty year 1996’ which, if funds were available, we’d all like.

In CUCAP one day the other customer was Armando de Guio who instantly joined AARG. Armando is from the University of Padova where he runs the ‘International Centre for the Study of Surface Archaeology’. They have three current projects running in NE Italy which approach a set of archaeological questions using just about every remote sensing technique and some exploratory excavation. It seemed to be a wonderful way of tackling study of a landscape and made use of technology and expertise in a way which I have not seen elsewhere. And, no, I don’t know where the money came from!

In November RCHME’s APU seemed suddenly to realise that it was 30 years old and a small celebration was arranged at Swindon (four moves away from the APU’s first home). The date coincided with a meeting of flying grant recipients (which, presumably, is why I didn’t recognise many people – all aerial photographers) and various other past associates had been rounded up thanks to Grahame Soffe’s black book. RCHME archiving had enabled Bob Bewley to supply Tom Hassall with highlights from John Hampton’s first flight report for the official speech. The flight was later re-enacted by John (complete with steep turns – see picture) who also conveyed to us the sense of excitement that resulted from those early flights and his mapping of the results. To use (more or less) his words... ‘By mapping the results of photography you realise that you have before you a pattern of settlement that no one has seen for two thousand years.’. I created a birthday card of

John Hampton re-enacting his first flight while his wife, Peggy, looks on. 
Photo: © Rog Palmer: 95.166/6
sorts with the words 30 years old and still sketching ‘crop marks’ which raised a thumb from John and a comment from Bewley that, ‘we haven’t been doing it that long’. I stand corrected. Of course, sketching only came in with NMP (perhaps, therefore, better called the NSP..?) in the early pre-computer days everything was mapped using proportional dividers and a mesh of networks or using other devices to provide the accuracy then considered to be necessary (see Hampton 1989, 20-23). At least, now that AERIAL 5 is released (Haigh, this issue), there will never be an excuse for sketching ‘crop marks’ (What about sites recorded in winter? I note that RCAHMS (see Moloney, this issue) only map features recorded under crop. Very curious sampling!)

Early in the year I received the first inklings of the ‘great crop mark crisis’ that is breached in this issue. This clearly deserves most considered attention and, perhaps, we should divert some of this year’s flying money towards the establishment of a panel of farmers and botanists to help us define our terminology. Travelling home a few months later, after spending a day with John Hampton recording the Conversation – a day in which we had talked for maybe three or four hours – I realised that the term ‘crop mark’ hadn’t been used once. But then, we were talking about archaeology. Serialisation of the Conversation (the morning instalment) begins in this issue.

Currently (early 1996) in Cambridge is Wlodzimierz Raczkowski, a lecturer at the Institute of Prehistory at Poznan, Poland. He seems to be the sole aerial practitioner in his country and is here to research a book that aims to indicate the values of aerial photography to field survey. Wlodek’s working base is currently CUCAP but he is attempting to tour around and see how other places function. We drove down to RCHME recently and, while we were parked on the A1M and M25, he argued that many users of aerial photographs were post-processualists! Well... now you know. The piece written by Wlodek notes his first perceptions of different practices in Poland and England.

Some of you will have heard of Otto Braasch’s plans for a training project in Hungary during summer 1996. It sounds like another very useful opportunity to help establish good working procedure in those countries new to the aerial view. Details are given in this issue and members from former Eastern Bloc countries are encouraged to apply. Instructors are also being sought and any volunteers will find information in the note by Otto and Bob Bewley.

Unusually, I seem to have been inundated with contributions for this issue. At last, more of you and less of me! I was especially pleased to be given the piece by Alice Deegan showing some of the thinking that can be applied to NMP output. While, admittedly, she has been allowed a certain amount of research time while undertaking this work with APS it was obvious to me that problems were arising and being mulled over during the routine mapping processes. This is just the sort of stuff that must be encouraged from those employed on the NMP and I can only look forward to more such thoughts arising over the next few years.

My thanks to those of you who send me electronic contributions. As any readers will be aware, there is little actual ‘editing’ done by me (there usually isn’t the time – you all believe that ‘copy date’ means ‘send-to-Rog date’) but it does help organise page layout and so more effectively produce AARGnews. It should now be possible to e-mail stuff to me although I have become aware that some servers are reluctant to handle certain types of file. So, why not give it a try – but DON’T send scanned photos!

Reference

CHAIRMAN’S PIECE

Marilyn Brown

As I sit down to write some remarks on recent developments in the field of aerial photography on yet another day in which the cloud cover over upland areas in Scotland has been too complete to allow useful photography or any aerial reconnaissance at all, I look back on a winter during which this phenomenon has been unusually prevalent: the carefully planned sorties have, even with three alternatives prepared, for the most part, had to be set aside in favour of gathering information in previously unsurveyed areas which happened to be clear, however briefly, of the covering of cloud, while preserving an exit route for the ’plane to lower ground. I return from such flights with the sensation of having wrestled with the landscape and the margins where habitation and cultivation appear to have been extremely restricted. While the exercise always results in the discovery of previously unrecorded sites, the sense of access to only a small part of a pattern is contrary to the grasp of the potential of the landscape that is one of the outstanding features of the aerial view.

Extending the aerial view to Europe, recent weeks have seen developments both in Hungary and in the Czech Republic. Otto Braasch has been instrumental in organising a training week for aerial surveyors and potential aerial surveyors from the former eastern bloc countries about which details are given elsewhere in AARG News. Martin Gojda of the Bohemian Aerial Archaeological Survey has been successful in obtaining funding for training as a pilot and has applied for a grant for the purchase of a Cessna 172 and for its maintenance. Only the Cambridge University Committee for Aerial Photography in Britain actually possesses its own aircraft with the flexibility this provides, as well as the operating costs that form part of the package. Martin Gojda has also been asked by the Organising Committee for the European Association of Archaeologists to act as chairman for the session on Aerial Archaeology at the second annual conference which will be held in Riga 25-29 September 1996. This marks an important step in the recognition of the importance of aerial reconnaissance as a archaeological technique outside the countries of north-western Europe where the subject has a long history.

This year, indeed, sees the completion of twenty years of archaeological aerial survey by the Royal Commission on the Ancient and Historical Monuments of Scotland. This is being celebrated by a conference hosted by the Society of Antiquaries of Scotland, with the Royal Commission, on Saturday 4th May, in Edinburgh. While the Commission takes the opportunity to pay tribute to early practitioners in Scotland, describe the results of its programmes and the progress in making the material available on a country-wide basis, there will be an emphasis on regional survey and on the application of information gained through aerial reconnaissance to the problems of research and the practicalities of managing the archaeological landscape. It should provide a useful summary of the position in a country close to, yet in many ways very different from, both England and Wales.

The date and location of the AARG conference have now been finalised and it will be held in Chester from the 18th-20th September 1996. Suggestions for thematic sessions and offers from speakers who wish to contribute to the conference would be most welcome. Please contact me at RCAHMS, 16 Bernard Terrace, Edinburgh EH8 7NZ.
**AIR ARCHAEOLOGY TRAINING PROJECT IN HUNGARY 1996**

based on details provided by Robert Bewley and Otto Braasch

The aim of this project is to provide training in archaeological and historical air survey for archaeologists from European countries of the former Eastern Socialistic Bloc. This will involve training in aerial reconnaissance as well as interpretation and mapping from aerial photographs. The project is a joint effort by AARG and the Janus Pannonius University of Pecs, Hungary. The Hungarian Ministry for Environment and Regional Policy with its Agency for Nature Conservation and the Institute of Archaeology at the Eötvös Lorand University of Budapest are both co-operating in the project.

The training project is intended to be a 7-day event for archaeologists and students from the former Eastern Bloc countries and will take place between 15-22 June 1996 south of Lake Balaton, Hungary, at Siofok Kiliti LHSK airport (flying survey) and at nearby Sagvar (accommodation, lectures. Depending on flying weather and aircraft serviceability, each participant will be offered between 13-18 flying hours during which aerial survey and documentation will be practised. Suitable aircraft will be provided without charge by AARG members from Germany and perhaps Great Britain - the final number is still to be set. With 2 aircraft the maximum number of participants will be 12, if 3 aircraft become available the number will be 18. Coupled with this will be a package of lectures and training sessions on aerial photography and its uses, including training in the interpretation of archaeological and historical features as well as an introduction into the neighbouring field of aerial survey for land use and nature protection.

The project will offer both theoretical and practical courses. During the flying phase experienced pilots and photographers will teach how to plan and organise a flying survey and will give an introduction to navigation, search practice, interpretation of features and their documentation by modern and conventional means. The economic and scientific aspects of a combined and integrated survey for archaeological and historical features as well as for sites which are of importance for nature protection programs will be stressed. Lectures at the Hotel Aeroport will be given by experienced archaeologists and other qualified scholars. There will be an introduction to Hungarian topography, history and archaeology as well as to current problems of land use and nature conservation.

Since there is not yet a central archive for archaeological and environmental air photos in Hungary, all air photos made during the course will be given to the Study Collection of the Department of Ancient History and Archaeology of the Janus Pannonius University, where they will be preserved. Procedures for their release for publication, etc, will be worked out by the organisers in accordance with national regulations before the training starts.

The detailed programme of the course, with more information about the location, links and highways will be sent to the participants after they have made their applications.

If available, participants should bring suitable 35mm cameras with them.
Applications for the Air Archaeology Training Project in Hungary 1996 should be directed to the Department of Ancient History and Archaeology, Janus Pannonius University, Damjanich u. 30, H-7624 Pecs, Hungary.
Tel +36-72-325932. Fax +36-72-315738.

Deadline for applications is Friday the 10th of May 1996. If the number of applications exceeds the limit of 12 or 18 respectively, the organisers will select initially by the date of incoming applications and on the effort for equal sharing of participation between countries.

Hotel Aeroport at Sagvar offers special rates for staff and students:
  Single room: 3.800 Ft with 15% deduction
  Double room: 5.500 Ft with 15% deduction
  Course students in double room per person: 1.300 Ft, no further deduction

Members of AARG are asked if they would like to volunteer to help in the training week for archaeologists from the former Socialist eastern bloc in airphoto interpretation in June 1996. The project has the backing of a number of institutions in Hungary and in Britain.

There will be a maximum of 18 students so we are looking for about four to six volunteers to show these students the skills of air photo interpretation and rectification. The reason for choosing June is to maximise the results from an aerial reconnaissance programme. It is hoped that at least 2/3 aircraft will be available during the week. The location will be at Siofok, near Lake Balaton, 110 km south-west from Budapest.

Volunteering to help is no small commitment; at present there are no funds available for those helping to train students. So far we have not yet received enough money to cover the aircraft costs, but a number of applications are still pending. The week will be a major contribution in attempting to bring the skills of archaeological aerial photography and interpretation to an audience which has been kept from the open skies for 50 years.

The good news is that Hungary has relatively inexpensive daily living costs and a week’s training might make for a good start for a holiday in Hungary!

If you want further information or are interested contact either Otto Braasch, if you live in mainland Europe (Tel: + 49 871 670701; Fax: +49 871670702; e-mail 100140,3262@compuserve.com) or Bob Bewley if you are UK or Ireland based (Tel: at home 01285 860166, or at work 01793 414757, e-mail swincsd@rchme.gov.uk). Dr Zsolt Visy at Pécs University will be making local arrangements, and colleagues from Budapest have also offered their help and support.
THE DERRICK RILEY BURSARY FOR AERIAL ARCHAEOLOGY

The Derrick Riley Fund for Aerial Archaeology was established to celebrate the outstanding contributions of Derrick Riley to aerial archaeology. The fund is pleased to invite applications for the first of these annual awards.

The award is offered to assist the bursary holder in the making, analysis or interpretation of aerial photographs. The bursary provides financial assistance up to the sum of £500 to help meet travel, flying expenses, film processing or similar costs necessarily incurred during the work. The panel will accept applications for smaller amounts and reserve the right to make two, smaller, awards if this is adjudged to be the most beneficial decision in any given year. In recognition of Derrick’s encouragement of young scholars preference may be given to younger applicants.

Application forms may be obtained from:

Professor Keith Branigan
Dept of Archaeology and Prehistory
University of Sheffield
Sheffield S10 2TN

to whom completed forms should be returned by 30 April.
Successful applicants will be informed before the end of May.

DERRICK RILEY

I am pleased to be able to say that both of Derrick’s cameras were bought by AARG members, who knew Derrick and respected his work. Mrs. Riley received more than twice the offer from her local camera shop – thanks to both of you. Clearly advertising in AARGnews works!

AARG members will be interested to know that photocopies of Derrick’s first two archaeological notebooks, together with his wartime operational diaries, have been deposited with RCHME archives at Swindon. The copies, which were made with the kind permission of Mrs. Riley, are on archival paper, which should ensure that they are preserved. The importance of the archaeological notebooks is that they contain details of Derrick’s WWII air observations of crop marks, followed by ground visits. These notes were the raw material for Derrick’s 1946 paper, ‘The Technique of Air Archaeology’ (Archaeol J, 101, 1-16). As such, these notebooks played an important part in the development of aerial archaeology.

Anthony Crawshaw
NEWS FROM EUROPE

Information mainly from Otto Braasch

During 1995 the Department of Archaeology within the Faculty of Arts of the MASARYK University in Brno (capital of Moravia, Czech Republic) for the first time offered a course in aerial archaeology. Lecturer of the 24-hour course, which was attended by 8-10 students, was Miroslav Balek. In June the students participated in survey flights of 40 minutes duration, for which they provided the money themselves. The course was part of a set of non-compulsory lectures during the term.

In January 1996 there was a one-day meeting organised by Martin Gojda in Prague. This brought together ‘local’ practitioners to present papers on their recent work. [The programme, sent to me by Otto, is almost entirely in Czech from which all I can tell you is that the phrase ‘letecký průzkum’ is close to ‘aerial prospection’.]

The second EAA Meeting at Latvia - Riga, 25-29 September, 1996. Martin Gojda did propose to the committee, to have a special session like ‘Air Archaeology and Landscape Archaeology’. The provisional program so far is out with ‘... II. Theoretical and methodological aspects, 1. New approaches in landscape archaeology ....’. I feel, we should show up at Riga in numbers to make EAA recognise, that ‘there is something in the air’.

The volume on the Kleinmachnow Symposium on Aerial Archaeology in October 1994 has been printed.

Title is Luftbildarchäologie in Ost- und Mitteleuropa (Aerial Archaeology in Eastern and Central Europe). ISBN 3-910011-08-X. Price DM 190,00

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AERIAL ARCHAEOLOGY IN THE MIDDLE EAST

David Kennedy

Introduction

Inevitably, most attention in your periodical is devoted to British and European developments. The purpose of the present brief report is to draw to the attention of your readers some of the developments in recent years in the Middle East. The intention is neither primarily to survey what has been done nor to repeat what may be read in recent publications or those in progress. Instead, I shall focus on directing readers to where they may pursue an interest in this rather different region.

As readers will know alongside the pioneering work in aerial archaeology in Britain in the 1920s and 30s, the Middle East was the other major location of such research. A brief history of aerial archaeology in the Middle East and discussion of the technique in arid conditions was set out by Derrick Riley and myself a few years ago (Kennedy and Riley 1990: chs 3 and 4). There is no need here to recap on that account other than to remind readers that active flying for archaeology throughout this huge region effectively ended everywhere some fifty years ago. Subsequent research centred on occasional use of old air photographs which served to remind us all of the enormous potential of the technique in this area. More than that, in the face of widespread and rapid development, they reminded us there was a great need for the technique to be applied widely and systematically.

Soon after, Derrick Riley himself, with financial support from the Society of Antiquaries in particular, was able to carry out three seasons of flying in Israel taking numerous low-level oblique photographs. One of his reports appeared in AARGnews 5 and another, with superb colour photographs, in Current Archaeology. Sadly, Derrick’s death was a loss not only to archaeology in general but to the growing opportunities for exploiting the technique. It is to be hoped that Professor Isaac and Dr Roll – with whom Derrick was collaborating in Israel – will be able to publish their findings so far and develop this initiative. Indeed, as the peace process there allows a relaxation in security concerns, we might look forward to aerial archaeology becoming routine in at least that one small part of the Middle East.

Turkey remains the major gap in the Middle East as a whole. There never has been any programme of aerial archaeology in that huge country with its vast potential. An opportunity seemed to open up in 1991 when the Director of the Centre for Remote Sensing at a relatively new Turkish university approached the present writer with a proposal to visit them and collaborate on a programme of aerial archaeology. Their university runs a flying training programme, has its own small airport nearby, and owns two helicopters and several light aircraft. Despite a successful visit, a meeting with their university President and a subsequent letter to him from my own Vice-Chancellor, nothing further has materialized. Or almost nothing – at my suggestion, they requested from their air force an old air photograph of the site they had been excavating right beside the airport. The aerial view was everything one could hope for – crop-markings revealed the buried defences of the classical and medieval town and the circuit of an entire suburb below the citadel. Until permission is granted, however – and three years have now passed - the photograph must remain on file only and the process cannot move forward. It is no coincidence that the same period saw the application by Dr Geoffrey Summers of balloon survey in that country – some of which was reported in AARGnews. Naturally, he was concerned with the survey of a single site only and from a very low altitude. The results, however, were most encouraging even if the technique itself is being employed for want of anything better. As matters stand, Turkish archaeology seems bound to continue to be practised without

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access to the single most important technique for prospection. For the moment, the fuller survey of what has been done and the potential of Turkey as Bradford noted almost forty years ago (1957: 5, 69-71) will continue to frustrate and tantalize (Kennedy Forthcoming b).

Despite the pioneering work of Poidebard and Stein in Syria and Iraq in the 1920 and 1930s, neither of those countries has shown much willingness to allow access to existing air photographs. Some have certainly been provided as illustrations for individual pieces of work such as for the Poles at Palmyra and to the Belgian team working in the Jezireh and at Apamea, and Wilkinson has recently built on the research of van Lière and Lauffrey in the 1950s to plot linear hollows around the settlements of upper Mesopotamia both in Iraq and Syria (noting that he was unable to look at air photographs for the region across the border in Turkey). Overall, however, relatively little use seems to have been made of them. Of course, part of the problem may lie with archaeologists not pressing hard enough to obtain material. One cannot help feeling that a country whose president is a former air force officer and which has a keen interest in developing its cultural heritage for tourism purposes – there have been two popular guide books to Syrian antiquities in English recently – has considerable potential if approached politely but persistently. One might begin by simply seeking old air photographs of a handful of specific sites or regions of no obvious security interest. Any one of us interested in the archaeology of Syria could come up with such a list very rapidly. Another approach is through tying archaeology more closely to tourism and hence a major economic imperative in the region. Indeed, many Departments of Antiquities are sub-divisions of the Ministry of Tourism. Most Middle East countries with developing interests in their cultural heritage as a source of income could benefit from producing the counterpart to Raymond Schoder's classic Ancient Greece from the Air (London, Thames and Hudson).

**Jordan** is the major success story in the region. Building on a long tradition of relative openness in allowing access to air photography, there have been several important developments. First, the Myers’, fresh from the completion of their superb Aerial Atlas of Ancient Crete (Berkeley, 1982) employing a balloon-mounted camera, have been at work on a number of sites in Jordan and plan a Jordanian Aerial Atlas. Second, is the fillip given to the aerial view by the continued success of Jane Taylor’s High Above Jordan (London, Argo, 1989). Moreover, several of the archaeological views she was able to take from a Jordanian military helicopter have now been printed as postcards and sold through the American Center for Oriental Research in Amman.

![Figure 1. Map illustrating extent of coverage of air photographs at 1: 25,000 taken by Hunting Aerial Surveys in Jordan in 1953 and held by Aerial Photographic Archive for Archaeology in the Middle East at the University of Western Australia.](image-url)
Third, my own research on the c.4000 diapositives of the Hunting 1953 vertical survey of much of western Jordan is now well-advanced. Some 15,000 sites have been identified and plotted on transparent overlays. The scale of 1:25,000 is far from ideal but ground verification during three seasons has underscored the valuable contribution these photographs can make. Not least, they record sites or elements of sites since lost to development. In recent years I have published several articles based in part at least on material from this collection (see bibliography below). Finally, it is of note that the Sixth Conference on the History and Archaeology of Jordan attended by some 300 scholars at Turin in Italy in June 1995 took as its theme ‘Remote Sensing’. It was particularly gratifying to be able to offer a paper (Forthcoming e) as I had given one on the potential of aerial archaeology at the first of these conferences at Oxford in 1980. It was readily apparent both from the papers devoted specifically to the conference theme and from those which followed on more general themes that seeking and obtaining air photographs in Jordan has become routine. The time now seems ripe to move further and seek permission and funds to support a programme of flying in Jordan specifically for archaeological purposes.

Figure 2. Example of part of one of the Hunting photographs. Illustrated here is a ‘kite’, an animal trap consisting now of a low boulder wall, with a ‘head’ with hides, and a ‘mouth’ and long ‘tails’ between which the animals were driven. Probably prehistoric, the example here, one of hundreds located in northern Jordan on the air photographs, has tails about 1 km long and a head c.400 x 250 m. Many of these are detectable even in areas now being farmed where the tails in particular are absorbed into the landscape as boundary walls.
Finally, a brief note on satellite images. There has been an increasing tendency to look to these both for their own sake as a source of evidence for landscape and vegetation, and for predictive modelling, but also to try and compensate for the absence of air photographs. Certainly, a satellite photo map can be most illuminating, and images were also employed effectively by the UNESCO Libyan Valleys team (Jones 1989) to locate and explain likely areas of farming. More recently, Peacock used a satellite image to help localize a famous seaport of the classical period on Egypt’s Red Sea coast and I have myself employed an image taken in the rainy season to help explain ancient routes in northern Jordan (Forthcoming a). Probably best known of all from the publicity surrounding it was the claim that satellite imagery had played a significant role in the discovery of the ‘Lost City of Ubar’ in Southern Oman. Undoubtedly there is already a role for satellite imagery in the archaeology of the Middle East; indeed, it is likely to increase as a wider range and better resolution images become available. The suspicion will remain, however, that too often images go unused by those who bought them or seem to be scantily related to the outcome.

Despite pessimism about some parts of the Middle East, overall, there is good reason to view developments during the last 10-20 years with optimism. If the peace process is successful, the opportunities in Israel, Lebanon, Jordan and Syria, should be
spark produced no fire, it suggests there are Turkish colleagues aware of the significance and need to make use of the technique and that there may be developments in the near future on other fronts.

References and related publications

Anon, 1993. Lost city of Ubar - Landsat finds ancient tracks on desert floor,EOSAT: Landsat Data Users Notes, 7, 1 and 5.


Riley, D.N., 1993. Air photography in Israel, Current Archaeology 136, 139-142.


AERIAL RECONNAISSANCE AND FIELDWALKING SURVEY: BRITISH AND POLISH REALITY

Wlodzimierz Raczkowski

Aerial archaeology has various aims. Through aerial reconnaissance we may discover new sites or can verify and update information on known sites. Aerial photographs can also provide information for studies on spatial distribution of features, on cultural landscapes, and many other topics. Aerial archaeology is really a very important tool for collecting and using data to assist evaluation of developments, and both monitoring and management of cultural resources.

According to this last aim I would like to present some remarks on the roles of aerial archaeology both in Britain and in Poland. In both countries there can be accelerating development which is especially visible since the early nineties in Poland. This development usually conflicts with the aims of protecting cultural landscape. To help prepare for this we are accumulating data on cultural remains, knowledge of which helps us to protect them. This search for data continues and it is here that field and aerial survey can play key roles.

Britain

From its beginnings in Britain, aerial archaeology has provided various types of data on cultural remains, such as earthworks, ditches, enclosures, barrows, field systems, Roman towns and villas, ancient road networks, etc. In comparison, fieldwalking survey, although it can produce a high density of sites (eg Hall and Coles 1995), is unable to cover such extensive areas so effectively and has played a lesser role. Why? In Britain, fieldwalking survey is influenced by many factors of which three seem to be the most important:

(1) search on areas covered by meadow and pasture is unrewarding,
(2) access to fields can be problematical,
(3) fieldwalking survey is expensive in time and effort.

From the air many features may be visible and survey can be easier, and more cost-effective. Features can be recognised as complex structures and seen in relationship to others and their environment. So in Britain aerial photographs ought to provide a basis for mapping data of cultural remains.

Poland

The situation is quite different in Poland. In the thirties Józef Kostrzewski successfully used aerial photographs to document his excavations in Biskupin (Kostrzewski 1938). Despite this, aerial photography is not a current technique in Polish archaeology. It is really very difficult to explain why Polish archaeologists are not interested in aerial archaeology. Maybe there were no enthusiasts like Crawford or Allen, maybe soil conditions are not good enough to show soil or crop marks, and maybe they are not aware of the potential of the method? More likely it has been the administrative restrictions, established after the Second World War, that have been the major deterrent to receiving permission for taking aerial photographs (Raczkowski 1995).

However, there are a lot of data on archaeological sites in Poland which result from the very long tradition fieldwalking survey. This work began in the 19th century in the form of so-called field excursions (Abramowicz 1991). Kostrzewski developed them into programmed fieldwalking surveys of chosen areas in the thirties. This tradition led to the formulation of the idea of recording all archaeological sites in Poland. The assumptions and decisions concerning this project, called Archeologiczne Zdjecie Polski (AZP; Polish Archaeological Record), were made in the mid seventies. For conducting this fieldwalking survey Poland was divided into rectangles of approximately 37.5 km². Each area, when mapped at 1:25000, fits conveniently on to an A4 sheet of paper.

During the fieldwalking survey each part of the area is examined in detail and each field, meadow, pasture and forest should be investigated. In Poland there are few
restrictions concerning access to land because in a totalitarian system archaeologists, as representatives of authorities, can do what they like! The information about every archaeological site is recorded on special file cards – The Archaeological Site File Card – and on 1:25 000 and 1:10 000 maps.

The AZP project may seem ideal for protection and management of archaeological monuments. However, this project has many limitations resulting from the very nature of archaeological materials and different conditions during prospection. The most numerous archaeological sites are those from which only one to three fragments of pottery (flints are even more rare) are recorded. There are relatively few sites on which more than ten fragments of pottery are recorded. These can be described as ‘occupation trace’ or ‘settlement’ respectively – although it is obvious that some such designations may be incorrect. Fieldwalking survey does not lead to the discovery of all sites. Some fields are better or less investigated because of stage of vegetation.

Let give me an example. A gas pipeline is being built from Yamal Peninsula in Russia to Germany and its route passes through Poland. The AZP project in the Wielkopolska region of this route had previously been completed but new fieldwalking survey has been done there in advance of pipe construction. Results of this included the discovery of many new archaeological sites on the one hand but, on the other hand, has not confirmed the existence of some sites discovered during previous prospection.

Number and character of discovered archaeological artefacts were the basis for choosing sites for rescue excavations. Not all decisions were the best and some excavated sites produced few traces of past occupation. How many sites will be destroyed because nobody has found them or their cultural value were not qualified correctly? It seems obvious that aerial reconnaissance may provide additional information on many sites on the route of the gas pipeline. But now it is too late.

Other developments are planned in Poland, such as a network of motorways. Will aerial reconnaissance be involved in associated archaeological processes? It is known that crop marks and soil marks are not visible every time. This is one factor in arguing that a project of applied aerial reconnaissance should be implemented immediately.

Conclusions
It is obvious that any future surveys – both for development and research – need to be planned so as to fully integrate aerial archaeology and fieldwalking. In Britain the threat of development has led to a process of evaluation that brings together data from several sources. In Poland, moves are slowly being made towards this end.

Acknowledgements
I would like to thank Rog Palmer and David Wilson for their kind suggestions and their hard fight with my Polish-English.

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North Nottinghamshire field systems - a landscape overview
Alison Deegan

Producing a landscape overview
Archaeological features in this area have been mapped and interpreted from RCHME and CUCAP verticals and obliques by Air Photo Services for the RCHME’s National Mapping Programme. All mapping was undertaken at 1:10,000 to NMP specifications. To produce a broader landscape view of this area, digital data from the relevant 1:10,000 quarter sheets was exported to the graphics package, PROFESSIONAL DRAW, and assimilated into one huge map from which the illustrations in this note have been derived. When printed to paper and viewed at smaller scale, the general pattern of the archaeological features is clear. Modern and geological features could be added to these maps to investigate their influence and impact on the archaeological features. Working through quarter sheets, it is difficult to follow the patterns of modern features like major roads particularly if the order of work goes against the grain of such features. By examining the greater archaeological landscape against the modern features, it became easier to understand the influence of the current landscape on the visible distribution of the archaeology.

The distribution of archaeological features

Modern constraints
The modern features masking areas of potential archaeology are those typical of any populated area in Britain – roads and settlements – and those that are more specific to the environment of north Nottinghamshire – large areas of concentrated woodland and parkland, many dispersed woods and extraction industry along the rivers Idle and Trent. It is not simply the identification of such features which is important but also their effect on the archaeological landscape and on its subsequent interpretation.

In *Early Landscape from the Air* (1980, Figure 12) Riley published a map showing the distribution of various categories of field system in north Nottinghamshire. Dominant is a narrow spine of ‘brickwork’ fields lying between, but not extending to, the rivers Ryton and Idle. However this spine is probably part of a much larger system which has been truncated by the route of the A1 road. NMP mapping has shown that there are field boundaries visible west of this blank corridor running towards the banks of the R. Ryton. Riley acknowledges the impact of the gravel pits to the NE of this spine to explain blank areas, but further to the south the visible distribution is also curtailed by Gamston airfield and the town of East Retford.

Environmental constraints
In small regional studies, the geology, topography and fluvial morphology are all pertinent to the distribution of the visible archaeological record. However both the pattern of archaeological activity and the visibility of that activity are influenced by such factors, thus it is often difficult to distinguish which factor is the predominant actor on a distribution pattern.
Drift geology

In *Early Landscape* Riley showed that the field systems he described as brickwork, has a close distributive relationship with the Sandstone geology in this area. This prompts the question, were those field systems restricted, and thus possibly a specific functional response, to farming on soils overlying the Sandstones? Or were such systems also in use on the heavier clay soils to the east and thus probably a more general functional type?

Photo interpretation and mapping shows that these field systems were not recorded on aerial photographs on clay soils east of the R Idle although considerable tracts of the medieval and post-medieval ridge and furrow are still upstanding in that area. If brickwork field systems were utilised there, and are of pre-Medieval date, they could be masked by these later fields. Clay soils generally produce less acute crop-marked responses, and show more poorly-defined soil marks, than better-drained soils. This has been apparent during recent research by APS in the Bourn area of Cambridgeshire where it has been noted that features on clay also tend to show crop differences very late in the growing season – possibly when the ‘conventional’ aerial photographer has ceased reconnaissance.

So, although the visible distribution of the field systems is restricted to the areas of Sandstone geology, the archaeological reality may be that ‘blank’ areas were settled and farmed using land divisions comparable to brickwork field systems. Moreover the experience of Chris Cox and Rog Palmer in the Bourn area has shown that, as the medieval landscape is gradually ploughed away, persistent reconnaissance in clay areas can yield evidence of earlier archaeological ditched features. It may be that this area of north Nottinghamshire also has potential for producing evidence of earlier features.

Fluviomorphology

The distribution of the identified field systems was considered against the current course of the rivers in this area. Clearly the dynamic and mobile nature of rivers and valleys has to some degree influenced the distribution of recorded archaeological sites.

The history of a river in this area can be broadly described as a continued pattern of erosion and deposition on the outside and inside, respectively, of the river’s meanders. In many instances on the inner side of the bends no archaeological crop marks are recorded. It is possible that, as can be seen elsewhere, these areas were not demarcated or settled. However, considering the depositional history of such areas it is more likely that dug features are either masked by successive deposition of river alluvium, or that features were themselves cut into the alluvium. Since crops on deep alluvium are less responsive to buried features than those above better-drained soils this may explain the apparent absence of crop-marked features in these areas.

In addition, active truncation of archaeological features is visible along the banks on the outer bends of the rivers Idle and Ryton and is documented in the neighbouring Trent Valley, with the partial survival of the Newton on Trent (Lincolnshire) vexillation fortress (Swan and Welfare 1995, 67-8).

Implications of these factors on the archaeological understanding of these field systems will be returned to below.
Archaeological-to-natural relationships

The field systems of this area are characteristic and distinctive in their general uniformity of morphology and alignment. These co-axial systems are parallel lengths of ditched and double-ditched linears, generally gently curving or sinuous, and sub-divided by short perpendicular ditches into probable field units.

The general alignment of the lengths appears to be east to west with minor aberrations. Taking this characteristic as one of the criteria for defining the brickwork field systems, field systems of a different alignment were initially thought, by myself, to be part of a different, possibly earlier or later, pattern of land utilisation.

However, mapping the river courses on the smaller-scale compilations it became obvious that the pattern was more subtle. The lengths of the field systems bear a close relationship to the routes of the rivers; a relationship which strengthens closer to the river banks. In brief, in the areas furthest from the rivers, the long axes of the field boundaries run perpendicular to the

Figure 1. Map extract from SK68SW showing the relationships between the course of the R. Ryton and long boundaries of the brickwork field systems. Based on original mapping at 1:10000 for RCHME's NMP. © Air Photo Services 1996.
general course of the rivers. The Ryton and Idle run roughly south to north and thus the general alignment of the field system is west to east. However, closer to a river the alignment of the long boundaries is more heavily influenced by the local routing of that river’s bends and meanders – hence the abrupt changes in direction of these boundaries (Figure 1).

This relationship suggests that the north-south aligned field systems near Thoresby Park (Riley 1980, Map 31) are not markedly different to the brickwork field systems, as they too run perpendicular to the Rivers Maun and Meden which actually run east west at this point. Also, the less orderly nature of the field systems to the north-west of the Ryton, rather than reflecting a more fragmentary and random pattern of land utilisation, mirror the more variable course of the Ryton at this point (Riley 1980, Map 12).

Thus the anomalies in the uniform east-west alignment actually translate into an aspect of a strict relationship between land division and the rivers. Also, the areas of low archaeological visibility can be misinterpreted as dividing the recorded landscape into ‘real’ archaeologically meaningful entities. Thus it becomes more important to try to understand how the area operated in socio-economic terms.

Land organisation and function.

Having established that the apparent blocks of ancient field systems mapped from aerial photographs do not necessarily represent real archaeological units I will turn to the more subtle indicators of land division observed at the intersite level.

The uniformity of the morphology of the field systems could be read as an indicator of a pre-set pattern – determined by a central body, and constructed as a whole. However there is much to suggest that the fields as seen do not represent a single phase of planned construction and undeveloping occupation.

The field systems

I believe that the close relationship between a local river course and field system alignments precludes the idea of a pre-planned network of land division. Groups, or bundles, of four or more field lengths are orientated to the nearest stretch of meandering river, hence different bundles have slightly differing alignments. Different scenarios are feasible. For example, fields may be constructed by a small community of people moving around the area as soils become exhausted using a standardised system of land division, or several contemporary communities living in close proximity to one another may agree to use a single system of land division.

This division between groups of fields is most clearly seen near Torworth (Figure 2), where two slightly differently aligned groups of fields meet and overlap. It would appear that at least one long boundary and its associated fields, possibly even the whole group, was out of use when the second group was established. This suggests shrinkage, if not desertion, of allotted land as the second group was brought into use. Elsewhere there is tentative evidence for the expansion of field parcels beyond the original land divisions. For example, at SK651858, the clearly round corner is in contrast to the normal T-junction intersection of field boundaries. Clearly, this was once a terminal point for the fields extending to the east. Also, photographs show that another ditch abuts this corner, in effect extending the allotted land to the west.
The nature of the physical relationships between land divisions and rivers is unclear. Whilst in many cases the long field boundaries run perpendicular to the river, processes of erosion and deposition have destroyed or masked any evidence of archaeological activity in the actual boundary zones. Water management would seem an obvious function for the expansive network of ditched field systems, yet modern soils on the Sandstones are well drained and need no surface-water control. Conversely, the rises from river to fields preclude them being part of an irrigation system.

Figure 2. Map extract from SK68NE. Based on original mapping at 1:10000 for RCHME’s NMP. © Air Photo Services 1996.

**Trackways**

The question of communications between enclosure groups, between enclosure groups and field systems, and between these features and possibly larger settlements not identified in this area, obviously has implications for the relationships between settlements in the area both in terms of contemporaneity of settlements and social organisation. However, there has been some reluctance and difficulty in identifying trackways associated with the field systems.

The distribution and form of the double ditched field boundaries suggests that they also define trackways used for movement through the fields. This is supported by their common relationship with enclosure clusters set within the field systems. However, Riley (1980, 23) argues against this interpretation, suggesting that a trackway, defined by ditches on either side cut into sandy soil, at widths of no greater than 4m in some cases, would have been unsuitable for driving stock. Excavators of such features have suggested that material from the ditch may have been piled between the ditches and stabilised by a palisade or hedgerow (Samuels
and May, 1980, 77). Unfortunately the latter has not yet been substantiated or otherwise because, in most excavated examples, plough damage has truncated the upper levels of the ditch fills. It must be noted that Riley, in discussing widths between ditches, was actually referring to the width between the visible *crop response* above the ditches, not their real width. As neither of the arguments have yet been proven it is still feasible to say that these features were indeed for movement between fields and enclosures.

Other, more functionally convincing, trackways are not always easily related to field systems. Parts of those in the vicinity of Hodsock do not respect the layout of the field systems – although other parts of them do (see Riley 1980, Map 17: at SK6184). Elsewhere there is better agreement between fields and the double ditched field boundaries, as near Broom Hill (see Riley 1980, Map 12: at SK6390). The Broom Hill feature is similar to, although slightly wider than, other double ditched features. Its ditches double as field boundaries, and its use for access is indicated by rutting in the centre of the track. A funnel entrance from a defined open area also suggests that it is more than just a boundary marker. However, this feature does not wholly conform to the layout of the field system: at its eastern end it turns sharply to the north and cuts across ditch-defined parcels of land. Other trackways cutting across the field systems have been interpreted as having entrances into the fields.

On this evidence, it is possible there existed a hierarchy of use: from small tracks leading between fields and settlements, to the more substantial cross-field system of tracks or roads running between settlements, and probably to larger settlements beyond this area.

The apparent contradiction in the layout of the field system and routing of the trackways suggests two possible relationships. Either the trackways are part of older routes across the landscape, overlain by the field systems but maintained in use and upkeep, or that the trackways developed as a response to economic and social growth within and beyond the area. Examples of both can be seen today in public rights of way and other maintained access across privately owned land.

**Settlements**

Although I will not go into detail on the matter of growth and change within settlements associated with the field systems, the relationship between fields and settlements is important. Enclosures, probably settlement sites of domestic and farming function, are fairly evenly distributed across the field systems, often located in clusters of three or more. In many cases it is clear that these enclosure clusters were appended on to a pre-existing field boundary, as ditches of enclosures often seem to abut, or possibly cut, the regular parallel field boundary ditches.

However, in certain cases it seems that the field systems were built around pre-existing settlements. The best illustrated example of this is the enclosure cluster near Green Mile Lane (Riley 1980, Plate 7, Map 23). Examination of the photographs suggests that the double-ditched linear kinks to accommodate the settlement enclosures within fields in the system. This change in alignment is reflected by adjacent field divisions to the north and south, presumably to maintain a reasonable field width. The interpretation of this relationship is supported by trial trenching: in section the enclosure ditch is clearly cut by the field boundary ditch (Samuels and May 1980, 74-77, Figure 13).
Summary
The scenario in this small region of north Nottinghamshire appears to be one of a few small settlements gradually bought under a semi-formal system of land division of groups of subdivided lengths of fields running between rivers. This led to the development of new settlements in the area. Whether this was the result of population increase, migration of peoples, or simply movement within the area by a smaller community cannot, of course, be told by aerial archaeology.

Evidence from excavated sites in this area would greatly illuminate some of the points arising from the mapping so far. Further enlightenment may be afforded by work in progress in the Trent Valley for the National Mapping Programme. There, Whimster observed a similar relationship between field boundaries and river courses (Whimster 1989, 86). To date, photo interpretation and mapping of Nottinghamshire for the NMP has shown the potential for comparison and contrast between past occupation in the Trent Valley and that on the Sandstones.

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Mapping in Scotland: the RCAHMS transcription programme.

Rebecca Moloney

In response to the discussion at the AARG meeting in Lincoln and Rog Palmer’s ‘Thoughts on Mapping’ (AARGnews11) I felt that it would be useful to make a brief comment on the transcription policy and practice north of the border.

The Royal Commission in Scotland does not currently have an overall national mapping programme for computer transcribing the whole of the country from aerial photographs. Transcription is restricted, except in certain very specific instances, to crop mark sites. Photographs of individual sites and complex monuments and landscapes are transcribed for a variety of reasons and these affect the nature of individual transcriptions.

All the transcription work is carried out at a scale of 1:2500. The benefits of mapping at this large scale are obvious when the sites are viewed through Genamap (RCAHMS Geographical Information System) as they can, and will be, displayed at a variety of scales and compared to other sites. As Rog notes (ibid.), sites are usually considered and dissected at a large scale so to map at this scale is a logical step.

Priority in transcription is given to sites threatened by development and to those proposed for scheduling. Areas selected by the Commission for ground survey, which also contain crop mark sites, form a second subject, while transcription projects designed to elucidate questions raised by particular crop marks or groups of crop marks take third place. Unfortunately, constraints on staff time make it impossible to take this further at present.

Manual plotting of all crop mark sites at 1:10000 is generally done in pencil directly onto the NMRS Record maps when the sites are catalogued to provide a simple visual guide to Record users, and these sketch plots are added to in subsequent years as further information becomes available. At the post-reconnaissance / cataloguing stage, a classification is given for each site which attempts to introduce a practical balance between description and interpretation depending on the nature of the site. All the cataloguing information is entered into the main NMRS Oracle database which enables users to produce a variety of searches and reports; it is also the primary tool for the production of the annual Aerial Photograph Catalogues. The Oracle database imports all the data, through unique numlinks, to the GIS, where it links up with data from a number of other sources including aerial transcription and field survey data.

The classification and cataloguing system naturally leans towards a site-orientated approach, but when viewed through Genamap, where the differing data sets can overlay each other, patterns of settlement and landuse emerge. The potential benefits of this system are huge and we are also looking at the possibility of using more analytical databases to enable wider searches on the aerial data. The transcription programme is one element of the research and work that is ongoing....
Another member of the AERIAL software family

John G.B. Haigh

Background

Back in September 1993, I submitted two short papers to AARGnews, one announcing the latest issue of my AERIAL software for PC computers (Version 4.20), and the other describing how I had used similar mathematical techniques to produce a rectified image directly from a digitally scanned photograph. While Version 4.20 still remains the standard DOS form of AERIAL, I have continued to work with rectified images, and I now have a program running under Microsoft Windows. My prime reason for arranging the new program to run under Windows, rather than under DOS, is because of the need to display images at the best possible screen resolution; Windows selects the best screen driver automatically, and provides an environment with which most users are familiar.

I have chosen the name AERIAL 5 for the new program, but some people may recognise it by its provisional name TRANAER. The new name identifies the antecedents of the program, even if it is liable to cause some confusion. Any copy of the program will also have a subversion number, currently AERIAL 5.02, identifying the minor variants which must occur as the program develops. The first of my 1993 papers explains how the name AERIAL came about.

Part of my thinking behind AERIAL 5 was that people often use the older versions of AERIAL for sketch plotting. They are not seeking great accuracy, but simply to locate the main features of a site with reasonable control of the errors. This approach is fine for a site with a limited number of distinct archaeological features, but it can involve much finicky work with the digitising tablet when there is a lot of interesting detail. Such extended effort may be worthwhile when the results are ultimately incorporated into a permanent map, but it seems to be inappropriate when only approximate results are required.

The great advantage of image rectification is that all the details are transcribed. You do not have to decide in advance which features should be digitised, and which can be ignored. This raises the question of interpretation, as many aerial archaeologists prefer to decide prior to digitisation which features should be shown in the transcription. With digital images, interpretation is likely to be postponed until the rectified image has been produced, but several advantages arise from this. The main features can be identified quickly, while retaining the opportunity for more detailed interpretation at a later stage; with digitised outlines, re-interpretation can lead to awkward editing of several sets of data. Features that have already been transformed into map co-ordinates may be easier to interpret on the basis of shape. Furthermore, if you wish to compare the appearance of a feature in two separate views, you have the chance to do so before making any sort of interpretation.

Scanning and rectification

The process of digital image rectification generally takes place in four separate stages:

1. The photograph is converted into a digital image, normally by an accurate high-resolution scanner. I personally use a Hewlett-Packard ScanJet IIcx, but any one of a wide range of flatbed scanners, all available at reasonable prices, should be equally suitable. Typically they have an actual resolution of 300 or 400 dpi, more than adequate for scanning archaeological photographs; beware of grossly inflated figures, which usually refer to a software interpolation rather than to true physical resolution. The scanner is supplied with
special software to drive an interface card, installed inside the computer. The digital image is produced as a file in any one of a variety of standard formats, but I have designed AERIAL 5 to accept monochrome TIFF (Tagged Image File Format) images. Anyone who wishes to work specifically with colour slides should note that there are special scanning devices for 35mm slides; AERIAL 5 is not designed to handle colour images directly, but it is possible to treat them as three separate colour planes.

(2) It is often a good idea to examine the scanned image and 'tune' it with the aid of photograph enhancement software, possibly by contrast stretching, histogram manipulation, and image sharpening. "Special Editions" of suitable programs, such as Aldus PhotoStyler or Adobe PhotoShop, are often supplied free with flatbed scanners. The aim should be to get the areas of archaeological interest to show with maximum clarity.

(3) The optimised image is transferred to AERIAL 5. As with any other rectification technique, the main problem is to establish the control information, which defines the transformation from photograph co-ordinates into map co-ordinates. In AERIAL 4, I arranged for all control information to be input direct from the digitising tablet, first by placing a map on the tablet, and then by replacing it with the photograph. Alternatively some or all of the co-ordinates may be typed as numerical values on the keyboard. I had difficulty in implementing a similar scheme for AERIAL 5, where the digital images are displayed on the computer screen. The first problem is that users may not wish to scan the map, and hence cannot have access to its co-ordinates. The second is that the mouse, which is used to indicate co-ordinates within the images, is not as stable as the cursor of the digitising tablet and may cause errors, if we rely on it entirely.

Bearing this in mind, I decided for the time being to arrange only for numerical input of control information through the keyboard. This is achieved through a large Windows dialogue box displaying all the control information; data can be added, deleted, or amended at the user's discretion. Photograph co-ordinates are shown as the mouse cursor moves over the displayed image. In order that control co-ordinates may be noted accurately, the mouse buttons may be used to zoom in and out of the image, and the mouse cursor takes a distinctive shape with a clearly defined central spot. Map control co-ordinates may have to be measured directly from the map. Once the control information has been read, it must be typed into the dialogue box. Map co-ordinates may be either in purely numerical form or expressed as British National Grid References; the program distinguishes between them automatically. A digital terrain model may be introduced if required, but it may have to be created with the aid of AERIAL 4.

Clearly this procedure is rather more laborious than reading co-ordinates directly from a digitising tablet, but it has some advantages. Information about the goodness-of-fit is shown in the dialogue box, and any obviously wrong co-ordinates can be edited in situ. The user can experiment with different combinations of control information, determining which control points are the most reliable and avoiding those which are rather doubtful. This sort of facility has been requested by users of AERIAL 4, but is difficult to provide without the editing power of the Windows dialogue box.

Once the control information has been sorted out in the dialogue box, the rectification may proceed. On modern PC computers it usually takes only a minute or so, before the rectified image appears in its own window. When the mouse cursor moves over this window, the image co-ordinates appear, together with their interpretation as map co-ordinates. This information can be used to build up a network of secondary control, to rectify other
photographs of the same site. The control file for the initial photograph is easily adapted for other views of the site.

(4) The rectified images from AERIAL 5 are stored as TIFF files, which are returned to the image enhancement package for final tweaking and for printing. It is possible to superimpose two or more images, in order to compare different views and to assess the overall accuracy. It may be worth making a final contrast adjustment, to suit the particular features shown in the rectified image, before sending it to the printer. Remember that the printed image, a passive display, rarely looks as good as the screen image, an active display, the difference being similar to that between a colour print and a projected colour slide. The TIFF files from AERIAL 5 contain scaling information, so that they can be printed almost exactly at any predetermined scale.

An example

Rog Palmer, the Editor of AARGnews, kindly provided an aerial photograph of a site near Helpston, Cambridgeshire, together with a digitised outline of the 1:10000 map. A laser print of the original scanned image is shown in Fig. 1. Fig. 2 is a print of the rectified image, which I produced at a scale of 1:2500. I have superimposed the outlines of the plan to give some idea of the accuracy of the results. You can see that there are some small discrepancies between the rectified image and the plan, up to around 3 scale metres in some places. These are not unreasonable in view of the nature and scale of the sketch plan, but they could almost certainly be reduced by persistent effort and with a detailed knowledge of the site. What is important is that many detailed features are shown in the foreground field, and that they can all be located to well within the maximum discrepancy noted above.

Clearly the foreground field is rich in detail, which can be explored further. Fig. 3 shows a section of the foreground field, now printed at a scale of 1:1000, and gives some idea of the amount of detail available, without by any means pushing the system to its limit. Because I have deliberately adjusted the contrast to suit the foreground field, the background field has almost burnt out. Fig. 4 shows a similar portion of the background field, again at a scale of 1:1000, with the contrast appropriately adjusted; in consequence the foreground field is now almost entirely black. Very few archaeological features are shown in this crop, and most of the visible marks are probably due to modern drainage patterns. The continuation of the ancient trackway from the foreground field is distinctly visible, and there appears to be some sort of large rectangular enclosure in the upper part of the figure.

The amount of detail visible in the final prints depends partly on the quality of the equipment and partly on the size of the images which are handled in the system. These prints were produced by my elderly laser printer with the standard resolution of 300 dpi. Since several dots are accumulated into a single pixel in order to give a half-tone effect, the maximum resolution in the rectified image is effectively 75 pixels per inch; the large dots clearly visible in the prints are spaced at the same density of 75 per inch. Laser printers with a resolution of 600 dpi printers are now commonplace, and these can show a corresponding improvement in the detail of the final image. Printers with a resolution 1200 dpi have been advertised, but I have not seen any output from them. If they are able to emulate an image resolution of 300 pixels per inch, then the results should be superbly detailed. We should beware, however, to ensure that the advertised resolution is a true figure, and not merely a form of "resolution enhancement", and that the appropriate Windows graphics drivers are available.
The other factor limiting the amount of detail is the size of image which may be conveniently handled by the computer. I prefer to work with images of not more than 1000x1000 pixels, since these are held in a file of convenient size and can be displayed readily on a standard Super VGA screen. If users are going to look for the sort of detail that requires resolution of 300 pixels per inch in the rectified plan, then they must find ways of storing and displaying very large images. The only alternative is to examine small sections of the image, locating them through AERIAL 5’s facility for secondary control.

Ongoing development

I am currently working on a Windows version of AERIAL 4. My reason for doing so is not to proliferate the number of versions available, but to see whether it is possible to merge the facilities offered in versions 4 and 5. For instance, it may be sensible to obtain map control co-ordinates from the digitising tablet, but to obtain photograph control by moving the mouse cursor over the digitised image. In the same manner, the best way to construct a digital terrain model is to work from a contour map placed on the digitising tablet, and there is no clear way of obtaining the same results from the Windows screen. There are difficulties in attempting to merge the two programs. Apart from the size and complexity of the combined program, there is the problem that different conventions are used to define co-ordinates on printed plans and in digitised images; the first locates the origin in the bottom left-hand corner, whereas the second locates it in the top left-hand corner. It is difficult to devise a data format which is applicable to both systems.

In the longer term, I hope to investigate how projections of a site from different views may be compared to reveal any variations in the surface topography. In effect, this would be a form of automatic stereography, obviating the need to use a digital terrain model when different views can act as stereo pair. It will require considerable effort to develop such a technique, but I am convinced that it is feasible with the current level of technology and that it could be accessible to the general user. AERIAL 5 has proved to be useful in rectifying architectural images, as well as aerial photographs. The stereographic development would be invaluable for architecture, where the equivalent of a digital terrain model is not available.

Summary

As I said at the opening section, I conceived AERIAL 5 as an alternative to sketch plotting for those sites which contain too much detail to be conveniently digitised by hand. I find already that users wish to push the program to standards well beyond my original concept. On the other hand, I recognise that AERIAL 4 developed to its current form largely in response the needs of its users, and I fully expect AERIAL 5 to develop along the same lines. I have my own objectives for the program, and I hope that they will eventually be adapted to the requirements of the majority of users.

Please contact me if you are interested in obtaining a copy of AERIAL 5. Unfortunately setting up a complicated program for a new user is rarely straightforward and usually occupies a few hours of my time. Consequently I have to make a reasonable charge for the supply of software. I shall be happy to supply further details.
Fig. 1. The aerial photograph of the site at Helpston, Cambridgeshire. This is a laser print made from the scanned image. In order to accommodate the print on the page, the image has been compressed by a factor 2, so that each half-tone dot represents four pixels in the image. Photo: © Rog Palmer: 95.109/7.
Fig. 2. The rectified image at a scale of 1:2500, showing the two central fields. The superimposed outlines have been taken from the digitised 1:10000 map.
Fig. 3. A section of the foreground field, rectified to a scale of 1:1000, showing details of the crop marks. The contrast has been adjusted to enhance these marks. Consequently other areas of the view have been lost.
Fig. 4. A similar section of the background field, again with the contrast adjusted to this particular area. Very few archaeological features are visible in this crop, but an ancient trackway can be seen continuing from the foreground field.
THE EARLIEST RECORD OF FROST MARKS AND CROP MARKS?

Anthony Crawshaw

Whilst reading *De Re Metallica* (Agricola 1556), which is one of the earliest scientific treatises on mining and metallurgy, I came across the following, in a description of prospecting methods:

“Further, we search for the veins by observing the hoar-frosts, which whiten all herbage except that growing over the veins, because the veins emit a warm and dry exhalation which hinders the freezing of the moisture, for which reason such plants appear rather wet than whitened by the frost. This may be observed in all cold places before the grass has grown to its full size, as in the months of April and May; or when the late crop of hay, which is called the *cordum*, is cut with scythes in the month of September. Therefore in places where the grass has a dampness that is not congealed into frost, there is a vein beneath; also if the exhalation be excessively hot, the soil will produce only small and pale-coloured plants. Lastly, there are trees whose foliage in spring-time has a bluish or leaden tint, the upper branches more especially being tinged with black or any other unnatural colour, the trunks cleft in two, and the branches black or discoloured. These phenomena are caused by the intensely hot and dry exhalations which do not spare even the roots, but scorching them, render the trees sickly; wherefore the wind will more frequently uproot trees of this kind than any others. Verily the veins do emit this exhalation. Therefore, in a place where there is a multitude of trees, if a long row of them at an unusual time lose their verdure and become black or discoloured, and frequently fall by the violence of the wind, beneath this spot there is a vein. Likewise along a course where a vein extends, there grows a certain herb or fungus which is absent from the adjacent space, or sometimes even from the neighbourhood of the veins. By these signs of Nature a vein can be discovered.”

(Pages 37 and 38 in the Dover translation).

History does not record the comments of the German miners when they dug up a Roman road, rather than the hoped-for ‘pay dirt’. Nowadays we might prefer differences in the heat capacity of the ground, and/or heavy metal salts in the soil, to the ‘exhalations’, as being the explanation of Agricola’s observations. That said, this is the earliest description of ‘linears’ that I have come across. The next case appears to be to observations by W. Camden in 1594 (Ashbee 1972, 42). For references to a number of other observations, pre flying-machines, see Benson and Miles (1974). Has anyone got an earlier reference?

References


THE GREAT CROP MARK CRISIS

Rog Palmer

No, this is not to do with the announcement in RCHME’s Citizen’s Charter: final draft that ‘...the National Mapping Programme ... aims to map those archaeological monuments – particularly crop marks – that can only be seen from the air.’. That, I hope will be cleared up (?)harvested) by their Director of Corporate Planning (Dr Whimster) who, in the past, has tended to see beyond the crop mark. In fact, Rowan Whimster’s minutes of the AARG meeting held on 5 September 1983 put the case succinctly following the occasion when I had taken in a cap gun to shoot undiscerning crop mark users.1

‘In a short, fierce, but apposite aside to his report, Palmer threatened unilateral retribution for an unforgivable sin committed by almost all members of the group: namely the loose and uncritical use of the term ‘crop-marks’. The latter, it was pointed out, is not an archaeological categorisation, but merely a description of the physical form in which different kinds of archaeological feature are seen from the air. If aerial archaeology is to progress, we must stop talking vaguely about ‘crop-marks’ and start to think in terms of the archaeological ditches, pits and walls that they represent.’

It gives me little pleasure to observe that I am still writing words to the same effect and makes the present ‘crisis’ quite farcical. Somebody – who was not present at AARG 1983, but that’s no excuse – incautiously told me that RCHME is currently looking into the correct way of spelling crop mark. Apart from being somewhat puzzled as to why RCHME need to use that expression in any archaeological thesaurus or inventory or data base or anywhere I can perhaps help save some public funds [please put it towards some post-reconnaissance grants] with the following suggestions:

**Cropmark** should not be used as, by linking the two words, it seems to give more credibility to the phenomena and may lead people to believe that cropmarks are worth knowing about. In the past we have read of excavations of cropmarks (difficult!), classification of cropmarks (presumably into green and yellow?) and, as we know, many SMRs list these as relevant archaeology. I fail to understand why a strand of cereal or a handful of beet leaves can be archaeological.

**Crop-mark** is acceptable English usage but still tends to make something out of nothing by compounding the two words. RCHME have used this in the past but it is not their currently accepted editorial style (Kate Owen, pers comm, 29 Feb 1996). I prefer use of the hyphenated words for adjectival use, as in, “I photographed some crop-marked ditches.”, but not. “I photographed some crop-marks.”

**Crop mark** is, to me, the most acceptable form and can be used in sentences such as, “I am an aerial archaeologist, I photograph crop marks.”. However, this still begs the question as to what crop marks are and why the aerial archaeologist is compulsively attracted to them.

Obviously a correct decision is crucial to our understanding of the past and we can sit with bated breath waiting to see which form RCHME decide to use. I suggest that, if the expression must be used, it should be in the form, ‘crop-marked ditches’, or, ‘the features were crop marked’. Such usage seems to be gaining favour with photo interpreters among us and makes some moves towards seeing through the crops to the archaeological features we seek to study. I have long sought a parallel that can be used to make the point that crop marks may be what we see but are not themselves the features of interest. I’ve only just found the obvious one. A man, observing a shapely woman walking towards him, does not think, “Nice pullover.”....

Any contributions ‘in defence of the crop mark’ will (?may) be welcomed.

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1Those noted as ‘dead’ on that date were, in order of speaking: Marylin Brown, Ian Shepherd, Lesley Macinnes, Val Turner, Grahame Soffe, Frances Griffith (‘very dead’ says the note!) and Rowan Whimster. A list of survivors can be provided on request. It may also be of interest to note who was present at that meeting and, of those, who were speaking.
AARG CONVERSATION N° 2, part 1:
JOHN HAMPTON and ROG PALMER: 30 JANUARY 1996

I visited John at his home in Epsom and had given him a copy of the photo of his ‘first flight’ taken during the APU is 30 celebrations. I commented that a number of us had been impressed by the way he kept his glass upright in the steep turn. We then glanced at a few examples of digitally produced maps that had been compiled from AERIAL 4 input and showed archaeological features on a background of selected modern detail plus environmental information (such as deep soil). There was a certain amount of introductory chat about types of computer and how I ‘drew’ on screen – none of which was worth typing out – and then we began to look more deeply at some of the mapping. I must confess to allowing John to read through the typescript and, for the sake of clarity, to make a small number of modifications.

It may help to know a bit about the Commission background: John became first head of the Air Photographs Unit in 1965 where I worked from 1968 to 1972. John and I tend to agree on most things and readers of this transcript are asked to imagine background rumbles of agreement throughout!

RP – This one was 1:2500 mapping in advance of development. It has got the areas of nasty soil on which helps on the ground.

JNH – Now isn’t that useful. I think that’s absolutely important, especially if you’re going on to geophysics.

RP – Yes, and to know where there might be archaeological features that we’re not seeing. A lot of these maps we put the deep soil on just for that reason. You know, “we cannot tell you what’s in here”.

JNH – Goes back to Dorchester [Oxfordshire] doesn’t it. Those bands of silt running across the field [photograph in Hampton 1974, fig 16; plan in Hampton and Palmer 1978, fig 3].

Another map [Palmer in press, fig 3]
Ah, Hallam¹, there’s a name to conjure with...

RP – One of your heroines to judge by what you’ve said.

JNH – Ah, yes she was, absolutely.

RP – Since I did the Lincolnshire [Fens] work I’ve been able to appreciate just how much she was getting out of those [1:10000] verticals. Whatever you think of the interpretations – because there was quite a lot of natural mixed up in it. But just to be able to do that from the verticals was quite an achievement. I wouldn’t like to do it just from those!

A lot more’s come up since. What was interesting when I was doing the Lincolnshire work was that, even though St Joseph and the Commission have covered Lincolnshire fairly thoroughly, I was still getting – I think I reckoned – about 25% ‘new’ information from the verticals.

JNH – One of the things that is slightly worrying – in the sense of reconnaissance and mapping – is that I suspect there might be a few who think that once an area has been mapped there is no need to do any more reconnaissance. And I’ve heard people talking on the television saying that essentially we’re going to finish all the reconnaissance by x date. This always strikes me that, in view of the circumstances of reconnaissance, the circumstances of the crop sequences and all the rest of it, it seems to me that it’s an absurdity even to consider it.

RP – It sounds like an English Heritage view. I wonder, as you’ve said that, whether the National Mapping Programme may well end up in the same situation as the Soil Survey did after they’d produced those quarter-of-a-million maps. ‘Right you’ve done it all now, thanks!’

¹Mrs Hallam produced the maps that for the basis of The Fenland in Roman Times (Phillips 1970)
JNH – Yes, except that I suppose that soil patterns aren’t going to change whereas the archaeology is going to change. Well, not change, but it’s going to become apparent where it wasn’t apparent before.

Another map

JNH – What’s all this about?

RP – I’m not sure. I’m not sure whether anything came up there. This is one of the annoying things about doing this [developer-funded work] is that we don’t always get the feedback from the ground. We can go and see the site if they’re local but there aren’t many people who send the reports, or comments, afterwards.

JNH – We’ve raised this point with the Surrey Archaeological Unit and asked that if they do use air photographs then please tell us what their results are. Did they actually find what they thought they were looking for, or whatever? And we’ve had absolutely no response. In fact they’ve gone to great lengths not to admit they’re using air photographs! I’ve taken photographs of a site by the side of the M25 where the air photograph evidence was ambiguous but all you can see is a series of narrow trenches sliced right the way across as a sounding. ... It’s a way of doing it I suppose, if you’ve got the money to do it!

RP – It’s the way most of them do it. This site will have been done as a, probably, 20% sample and they normally work on ... well a 5 x 5 metre trench is the biggest you would normally expect.

JNH – I’m obviously not up to date.

Another map

RP – This shows the versatility of digital mapping [the map showed soils in the Lincolnshire fens using different density stipple]. I probably would have changed these several times. It’s like slapping down Letratone – but if you don’t like it you can just press a button and change it – rather than ... well you know what it’s like. The graphics package we’ve got, which unfortunately seems to have gone out of production now, has got – it must be a hundred – ten different tones with ten densities like different black and white letratones.

JNH – Oh, if only we could have done that in the past. Just think of the background information and how important it is. Absolutely marvellous. And you can do it in a time scale which isn’t that costly?

RP – I’m as quick doing this as I am drawing now. In fact I don’t think I’ve drawn a pen line for a while now. It took time to learn it. We would deliberately set aside time or take an assessment and say, “I’m going to put this through the computer even though I know it’s going to take longer than we are charging them.”. It’s a way of learning and a lot of the early ones look quite crude now.

JNH – Well, you’re on a learning curve aren’t you.

Another map, comparing a chunk of Roman fen landscape with a modern Fenland village area. [Palmer 1995, fig 3; forthcoming]

RP – It doesn’t matter where it is. Which is the modern one, which is the Roman one? That’s what I’m using it for.

JNH – I guess that that’s the Roman one [correct!] and that’s the modern one. [Jokingly] They didn’t have villages in Roman times! Just as a matter of interest, where is it?

RP – The Roman area is in Lincolnshire and the village is in Cambridgeshire and just happens to be on a roddon. As far as I’m concerned you’ve got exactly the same – you’ve got the roads, you’ve got the fields, you’ve got the ‘domestic dwellings’, if you’d like to call them that.

JNH – This underlines what I said to you a moment ago – that we’re actually looking at people, we’re not looking at just ditches, but
we’re looking at people and what they actually did and presumably this [the mapped area] is going to cover, what, three or four generations – who knows?

RP – The pottery from all of this is boringly second to fourth century. There’s not much breakdown between.

JNH – You’ve got to have more than that. But one can imagine the process of an evolving landscape associated with economic and social pressures – but how difficult this is to measure with a twentieth century eye.

RP – What I wonder about in this really densely occupied landscape is whether all the settlements could have been occupied at the same time and whether ... because of the, what would you call it, the land capacity. Whether the land could support that many people.

The field walking – and a lot of the Lincolnshire work I did is in areas which were field walked for the Fenland Survey [Hayes and Lane 1992] but as two completely different projects. The people who did that work were a bit disappointing when I asked if they had any more information about the dates. They hadn’t, they really are that broad. And there are a lot of areas where – on this map – the blobs are what they’ve called ‘sites’ from picking up pottery and a lot of them coincide with what I’d call a ‘site’ [settlement] from the AP evidence. But a lot of them don’t. In the case of this Fenland Survey we know whether they’ve walked on a particular field or not but I know that you can go into a field in two different seasons and one year you find something, one year you don’t. If this was done at the right time – if the AP work was done with the field survey I would think you could get the question-and-answer sequence going. I would like, for instance, to do more flying where they’ve got sites and I haven’t – and I would like them to look where I think I’ve got sites and they haven’t come up with anything.

JNH – This interaction between what I’d call the air side and the ground side is very weak in many cases, isn’t it. You really want a discipline applied to it.

RP – It’s totally weak in this country! I think it’s happening in eastern [sorry Otto!] Europe.

JNH – That’s interesting. That it should leap-frog in a sense. Because here we have long-established methods of thinking it seems to act as a disadvantage. In my OS days the archaeological field surveyors did use air photographs, but I suspect in some cases a specialist photo interpreter would have added another dimension. Sometimes I have the sensation that some field men have the “I know it all” syndrome, but depending on the soil/geology of your area you could lose a lot of information by not using the air photograph when field walking. It’s rather like not using the Archaeological Journal because it doesn’t contain all the information we want.

RP – I still think that to some extent the fault lies in the aerial world because we haven’t demonstrated, to a great extent, what we can do.

JNH – I fear you’re right. I’d like to say it was the other way round but I don’t think it’s all that way. I think if the field worker completely understood the information that was available, he would demand it as of right. But it’s a chicken and egg situation isn’t it. But there again, that goes back into the tradition of aerial archaeology doesn’t it, because aerial archaeology is something wonderful that only a few people know about! [general laughter].

RP – I’ve been saying recently, and people must be getting bored now, that there is a limit to the progress we can make until the aerial photographs are taken away from the aerial photographers. I think more and more now that it’s the interpreters that should be – what do you call it? – setting the agenda.

JNH – I’m sure that’s right because the aerial photographer has the bird’s eye view and has the whole range of information that he’s actually seeing in his mind’s eye. And it is up to him then to sell it to other people. But having said that, I remember when we were at an AARG meeting, probably the last one that I went to, and I said, “wouldn’t it be a good idea if we had groups of interpreters coming from different disciplines dealing with the problem of an area”. And I remember one young man, whose name fortunately I’ve forgotten, got up and said that, no, he didn’t want anything of the sort
because he could do it all himself. And I thought that that was arrogance beyond measure ... because you know and I know that our interpretation is only as good as our knowledge. And our knowledge, or mine certainly, is pitifully weak in some areas. In some areas I can claim to know a little bit, but mostly there is this vast range of information that one isn’t aware of.

RP – Yes. And having said that, every time I look at the same photograph I would expect successively to improve my interpretation of it.

JNH – You’re on a learning curve – we all are – and every photograph, in a sense, is a different proposition. You may apply principles or knowledge that you’ve learned elsewhere. To your own cost [laughter]. I don’t think I shall recognise rabbit warrens as long houses anymore [Hampton 1981; 1983, fig 87] – but you have to learn these things.

RP – I had something similar recently. I think you see something and it’s very difficult to open your mind and see around it. In an assessment I was doing recently in Suffolk there was an area of dark soil with a rectangular-ish ditch around it. And inside this you could still see the foundations of – it wasn’t round, it was a straight sided ... circular thing. A straight-sided circular enclosure – put that in MORPH! I looked at that and I couldn’t get away from the Roman temple concept. You could see on the photographs that the plough was actually bashing the foundations, and we all know that this happens in France, therefore it must be a Roman temple. It turned out to be a – I think 17th century – warren’s cottage. I think it will be quite nice to have that written up – the Suffolk chap offered to do it so ... it’s about time I was made to look a bit silly. But it’s what you’re learning all the time.

JNH – The other side of the coin is that with Surrey, because I’m here and I’m involved, I can take responsibility for what I put on the map. But there is another point of view. I broadly follow the principle that anything I don’t understand I’ll put on the map. If I can’t associate it with ‘yesterday’ I’ll put it on the map and say that I don’t know what this is, but look at it. Now somebody, perhaps, will say, “what has this silly old fool put on this map? That’s a” ... think of something stupid ... “a rabbit warren”, or “that’s a drainage ditch” – or whatever. But to me, when I looked at that photograph I didn’t understand it. Now, that can lead to a debasing of the standards. People can say that ... after looking at 100 of John Hampton’s things I’ve only found one that’s any good. Now, in my view that’s worth it in a sense, because the other 99 should therefore be identified and not be considered at a later date. But – it’s a tricky situation because they could say, “I’m not going to bother, we haven’t got the time to spare, we haven’t got the money to spare.”

RP – Do you vary this with the scale that you’re mapping? Or with the reasons for mapping? In the assessments we do we put down anything – virtually – as you said, anything that’s not ‘yesterday’. And tell them, “You will find this on the ground, we think this is archaeology, we’re not sure about this, this is dubious, this is drainage”. But if I were mapping – let’s say for the NMP at 1:10000, I would tend to leave out anything I wasn’t sure about.

JNH – This is where I think that if you have a card to go with the site (now I argued this in the office and people were most reluctant to take this on) you would actually have a work analysis when you’ve interpreted something [see Hampton 1983, fig 77]. You could say that, “I’ve put that in but I don’t know what it is”, or you put that in and say, “I know what this is and I think it’s so-and-so.” If you do that you have a record that survives alongside the drawing because I contend that there are things that you want to say about your interpretation that you can’t put actually on the drawing.

RP – Agreed. It’s having the time to do this. With the Lincolnshire work – which never quite caught up with what NMP expected – I was writing what I call an AP-SMR which is comments on the photographs or each, what Rowan called the mapping unit, rather than on the mapped sites. So I’ve got a series of individual comments. But it’s having time to do this. The NMP is pushed enough already. They’re after x number of sheets done a week. One of my busiest Lincolnshire quarter sheets took 66 days (JNH – I’m not surprised). There’s more lines on that sheet than there are
on the modern map. At that time I was working 100 days a year on NMP and was not making the type of progress that was expected.

JNH – All I’m saying is that a card index can carry information on what you thought at the time. It can tell people the photographs you used, and so on and so forth. For your successors, it seems to me, that this is an absolute necessity.

RP – It is. ... I’m still not quite sure how much subsequent use, or what subsequent use, is going to be made of this sort of information.

JNH – Oh, I suspect most of it will just disappear into a file. But in Surrey’s situation I hoped, and I still hope to some extent, that people will go out on to the ground to do something about it.

Another map [Palmer in press, fig 4]

RP – This is from something that ought to be out later this year. Arguing, what we’ve been saying, that field survey ought to be integrated with photo interpretation.

JNH – This does raise some very interesting points. Just think of the politics of it. What does one do about a landscape, an iron age and Romano-British landscape covering, what?, nine square kilometres. What does one do about it? Modern life has got to go on, people have got to do all the things they want to do... The thought of even sampling that, the cost would be astronomical ... and having sampled it, what would it tell you, how much more would it tell you?

RP – I suppose it’s one stage further .... If you assume the ‘busy’ areas are settlements I would like to see more dating evidence from them and I think there are limits to what can be determined from field walking because you’re still only getting the top layers – or should be! Even if you put single trenches into these, especially if they’re waterlogged, it’s costly and long-term.

JNH – I’m not sure that current techniques are adequate. Do you remember that thing I published near the Car Dyke, Billingborough [Hampton 1983]. The excavator said that he, “didn’t see a ditch there and I’m jolly sure there’s no ditch there”. The point is that you’re looking at a photograph which gives you an extent – 50, 100 metres long – and you can see the alignment. An excavation trench, say two or three metres wide, may simply not be wide enough to recognise what may be no more than a very slight discontinuous feature unless you were precisely looking for it.

RP – A lot depends on the excavator.

JNH – And the conditions. If you have a rescue excavation and it’s teeming with rain ... Unless you get the Time Team on it!

RP – One thing that I have realised. I’ve not done any real excavation since 1982 at Hambledon and at that date we were getting really skilful diggers – the Weymouth school was churning them out – who could look at a section and see – convincingly – no end of stuff where, as a simple digger I’d have primary silt, secondary fill and something on top, and they’d have all sorts of things going on. There are people now who have got a much higher ability of seeing things in the ground and understanding – especially in areas they’re familiar with – than I ever had.

JNH – This is encouraging. But it does seem to me that unless you relate the two sources of evidence, the ground and the air – precisely relate them, not just chance-relate, so that you know precisely where it is on the plan and when you’re excavating you know precisely where to look and where you are. This seems to me to be absolutely fundamental.

RP – It happens, should happen, in the developer-funded work now. The ones that are done in that correct sequence.

JNH – Under PPG16 we’re getting limits now that they will only do the footprint of the building. We have a Saxon cemetery at Croydon and they will only give funding to the footprint of the building. So you do the building – and then they put in a concrete forecourt, or whatever it is, and that’s it. ... After all, it’s only archaeology!
There followed a brief excursion into the realms of professional and volunteer excavators which came back to a point John made before we began recording – about the choice of sites used for training excavations.

JNH – One needs to spear-head an approach, to ask questions, and excavations should be designed to do precisely that. And you hope that a site is going to answer particular questions. But to go out and just dig a site because it’s there, or because people want training, is ... laudable in some ways, but it does mean that site is destroyed. And I still think that we should be very humble about it because I suspect that in fifty years time techniques for excavation and the refinement of technology will be able to produce answers that we can only dream of today. But how true that will be I’ve no idea of course ... I won’t worry about it!

Wheeler was considered the arch-excavator, the man who did everything and everything correctly. Nowadays, of course, we probably put a different gloss on it.

RP – But we’re looking for different things now, we are approaching the sites differently.

JNH – Rightfully so. Again, there’s the arrogance of the day, isn’t there, “Look how much we know.” But he did his best according to the information then available. This is all we all do surely.

RP – This reminds me of the Danebury area. You would have perhaps enjoyed listening to Cunliffe at AARG last year. Who summarised the work he’d been doing outside Danebury where he’d dug – forget the hill forts, he looked at Bury Hill and, I think, Woolbury – and then two or three of ‘my’ sites. I felt quite sorry for the poor bloke because he’d worked out all these theories about Danebury being the central place and none of the sites he looked at seemed to have anything whatsoever to do with Danebury. I still think the approach that John Boyden suggested to me when he was doing aerial photography when I was working on my volume [Palmer 1984] – “What you need is a JCB for a couple of weeks and dig small holes in as many of these sites as you can.” I put that to Barry years ago and it was very firmly thrown out – this would not be giving him any of the sorts of information that he wanted to tie in with the very sophisticated chronology that he’d got from Danebury. The fact that it would give me information that was useful to me as a photo interpreter – in very crude dating terms – didn’t actually come into it at all. But there is more than one question that is important, wouldn’t you agree? And we’ve got these landscapes that, as Rowan said years ago, sometimes we don’t even know what millennium these sites belong to. We’re still at the level where we want fairly crude dating information for these landscapes.

JNH – When you talk about Barry ... I can imagine what he would have said, I can see him saying it in a sense, but I do wonder of this obsession, almost, with vertical stratigraphy. We’re looking now at horizontal stratigraphy – if you can use that term – and the relationship and the sequence of development of a pattern, of one pattern on another. And it does seem to me that, without trying to denigrate or to reduce the validity of the vertical stratigraphy, they’re like fish and chips – they’re two different things and they go together. One of the things that we’re losing out on, we’re not seeing this broad spread pattern, the relationship of one thing to another. Your work on Danebury always struck me as almost a cause celebre, you could go into court and say, “we’ve got this pattern and we want to know what it means.” Digging a hole, a vertical hole in a hill fort will tell you quite a lot, perhaps, about the hill fort itself but it won’t tell you about the spread. Why is it that archaeology doesn’t seem to want to come to grips with this problem? You talked a moment ago about ... because we, the aerial archaeologists, haven’t shown the pattern to the field worker and that because of that he doesn’t do it. Now then, when was Danebury published? 1983, something like that? You’re talking about ten years ago and it was known about long before that [Bowen and Cunliffe 1973] and yet the response from that has been absolutely minimal as far as I can see.

RP – Yes. Or less, if that’s possible.

JNH – Why is that? Why is it that archaeology finds it so difficult to come to terms with this? Is it because, historically, we have been focused so long on this vertical stratigraphy? Why shouldn’t we look at the
wider extent. *Bokerley Dyke* (Bowen 1990), for example, illustrated patterns of land use divided by a linear boundary. The research ranged from intensive flying – I think I could find my way there blindfolded – to analytical field survey of the highest standard. The area reflects the complexity of several millennia of land use, but the wider implications of the differences that were found still remain to be addressed.

RP – Even so, the Bokerley volume is one of the few that actually combines the aerial evidence with some other form.

JNH – Yes, absolutely. That was a first-class volume. It did all the sorts of things we were talking about – but again we come back to the problem of analysing evidence in different ways for different purposes. The sort of research we are talking about demands a willingness to create a hypothesis for somebody to shoot down. I seem to remember reading that people like to be right and they are unwilling to take speculative risks because they may be proved wrong. An attitude which may well hinder enquiry!

RP – I was lucky enough to work with Collin during the early stages of Bokerley [1975-6] and was able to learn from some of his approaches. He was always thinking and probing in an effort to understand what had been going on, and why. In those days – probably now too – I gave poor responses to such powerful investigation and could do little more than be amazed and attempt to learn. Although Collin would say his thoughts, he is – sensibly – a cautious writer. It would be interesting to read his original text for *Bokerley*, and see what was cut out, because it went through at least two editors, didn’t it?

JNH – Mmmm, very cautious. Understandably so. But for us lesser mortals we can say what we like and not feel that we’re ....

While this had been going on, Peggy – John’s wife – had prepared a lavish lunch during which we caught up with a number of old aerially-related friends and reminisced about the early days of the APU....

**References**


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THE REMOTE SENSING SOCIETY:  
ARCHAEOLOGY: SPECIAL INTEREST GROUP

Rog Palmer

A meeting was held on 26 February 1996 to launch the above group. Its formation seems to have been conceived by Chris Brooke and Danny Donoghue both of whom have dabbled in various forms of remote sensing for many years now. The meeting was attended by some 50 people of whom maybe one third were archaeologists and comprised more vocal part of the crowd.

Six papers were given ranging from the high-tech to the basic. Danny Donoghue and James Lyall reported briefly on work in the Heslerton environs which has mixed and compared information from oblique photographs with high-resolution colour and MSS verticals taken by NERC specially for the project. All information is stored digitally and thus much fun can be had with the computer. This is the type of work, currently concentrating on a 10 x 10(±) km square, that perhaps can affect future reconnaissance over wider areas by testing and comparing different sensors. Hopefully the Archaeology SIG will provide a platform for discussion of experimental work such as this.

Chris Brooke gave a colourful presentation covering his work with ground-based remote sensing (older information on this was the subject of IFA Professional Paper 7). From this came the demonstration that UV showed soil differences – some invisible to the human eye – very clearly. Unfortunately UV-sensitive film is extremely slow but, he said in discussion, Kodak’s TMY (T-max 400) can be rated at c.6400 asa and used with a UV filter. Possibly their 3200 asa film (TMZ) may also be useful for that. These film speeds may seem high to most aerial photographers but are familiar to me from some of my non-archaeological photography – slightly grainy but no problem to expose and develop (just take a cup of coffee and a book into the darkroom!). A scan of my photography books gives no information on taking UV pictures. I think the filters are opaque, thus necessitating some external sight on the camera, and I am told that the wavelength requires use of a ‘short infinity’ focus or a stopped down lens. It is tempting to give it a try on a future flight and I wonder if any other AARG member has tried it in the air?

At the end of the meeting there was agreement to form the special interest group. Some AARG members may benefit from joining the (there was a fairly small aerial contingent present on 26 Feb) while the group may benefit from contributions from AARG members. It is intended to produce a newsletter and include the optional extra of e-mail communication and discussion between colleagues. There is also the potential for mixed meetings with other special interest groups. Sounds familiar?? It reminded me of the early days of AARG when there was a certain amount of open questioning about what we were doing, how to do it, and why – and I can only hope that such an approach may be maintained within the RSS group.

 Anyone interested in further details should contact:

 Dr Chris Brooke. 3 Woodland View, Southwell, Notts NG25 0AG
 e-mail: tazsecjb@vme.nott.ac.uk

The memory is still vivid of Mike Jarrett striding up and down the lecture theatre at University College explaining to a pack of bewildered undergraduates the significance of Roman camps. How, if Tacitus was correct, the II Legion must have done this, or perhaps the Boudiccan revolt meant that the IX Legion did that. Trying to spell strange sounding names of obviously significant sites that we all ought to know and rushing off afterwards to consult *Collingwood and Richmond* or the Ordnance Survey map of Roman Britain to try and make sense of it all.

My brain used to ache trying to play the three-dimensional chess game of Roman military history in Britain. And worse, was attempting to unravel the dating evidence from the few published excavations.

The first illustration in *Collingwood and Richmond’s* chapter on camps seemed to make the identification so clear. But over the page was a confusion of variations! The standard playing card shape with rounded corners was easier to remember. It was later that the strange distribution of Roman camps, limited to northern and western Britain, became apparent. But this started to change in the 1970s as new camps were found in Nottinghamshire, Lincolnshire and Devon.

Not so long ago at a debate on the future direction of the Royal Commission on the Historical Monuments of England I bewailed the passing of the County Inventories. At the same meeting somebody else commented how difficult he had found it to obtain a list of all Roman camps in Britain. His wish has been partly fulfilled because in a splendid volume the RCHME has produced a superb survey of Roman camps in England. Written by two of the Commission’s most experienced investigators with due acknowledgement to the assistance of the late Ray Farrar a particularly modest but very competent Romanist, they have produced an eminently well-researched and readable account.

With my typical English insularity the first sentence of Lord Faringdon’s foreword was news to me: “Only in a few places within the bounds of the former Roman Empire do the remains of its military might still exist in such profusion and complexity, and in such a relatively good state of preservation, as in the former province of Britannia.”. Like most field archaeologists I have tramped over the earthworks of Roman cameos. More often I have had the sites, known only as cropmarks, pointed out in flat ploughed fields. But, despite Mike Jarrett’s best attempts, I had never fully appreciated the significance of what was there until I read this volume.

Wisely, the authors have not attempted to utilitise the camps to explain England’s Roman military history. Instead, after an introductory essay, they have provided an inventory of over 130 sites. The essay in itself is a masterpiece although, I have to say, that it is a relief to find that *Collingwood and Richmond*, still my old stand-by survives as an introduction. But, I would like to remind the authors that the finders of camps lampooned in *The Antiquary* still exist. Straight liners and those with bizarre notions of otherwise innocuous humps and bumps, create endless problems for Local Planning Authorities.

The essay lays to rest, I hope, the old axiom about the ankle-breaker or cleaning slot which often has been claimed as a characteristic feature of Roman Camps, but apparently rarely found. More intriguing though is the apparent incitement to excavation. At a time when to think about research excavation seems heresy, the suggestion that there is a serious lack of excavated data, would seem like positive encouragement to those of us who enjoy digging.

It goes without saying that aerial photographs are the best way to appreciate the surviving earthworks and cropmarks of Roman Camps. In the best tradition of Crawford and Keiller,
this volume provides 76 transcriptions of aerial photographs which have been supplemented by checking on the ground for surviving earthworks of a further 56 sites. I am pleased to see, as I have tried to train Rog Palmer, that an Ordnance Survey background of the current situation on the ground, is provided. Non-aerial photographic specialists find that a map with only cropmarks or earthworks and grid points very difficult to set into context.

Nothing can be perfect and I am left with the criticism of how much more impressive colour photographs can be than black and white. The front cover photograph of Haltwhistle Burn is fantastic compared to its corresponding black and white photograph in the inventory. But, if the present volume with black and white photographs is £35, which of us would be prepared to pay for the same material in colour?

A more minor criticism, which I could probably sort out with more time, is the disparity between those sites included in the inventory, those shown on the current Ordnance Survey Historical Map and Guide: Roman Britain and those which I thought had been identified as Roman Camps. A basic list of all sites and the author’s views as to why or why not they had been included would have been useful.

In the meantime, I can only marvel at Roy’s 1774 map of Chew Green and the RCHME’s survey and hope that I could produce something as accurate.

John Samuels
19 January 1996


It was September in Bologna. I was on holiday and it came on to rain, so I plunged into the bookshop for shelter, looked at the archaeology section and, there on the bottom shelf, what should I see but an Italian textbook on aerial archaeology?

It’s not half bad either. Giovanna Alvisi gives a useful account of the state of the art in Italy before the University of Ferrara began to make low-altitude reconnaissance of the Po valley in the 1990s. Virtually all of the illustrations used are examples of official photography, mostly high-level verticals but also obliques (The one exception is a photo of Lambaesia attributed to Baradez, which she needed to illustrate landscape under snow.)

So far, so predictable; but the detailed case studies do much to elaborate the scope and the rewards of working with this sort of material, which is relatively unfamiliar to the British reader. Possibly the most valuable section of the book, however, at least for the British archaeologist working in Italy, is the short chapter on Italian A.P. archives, including the Aerofototeca in Rome. This is information which is not easily available elsewhere.

For those with a strong interest in aerial archaeology in Italy Alvisi’s book is certainly worth the £14 odd that it costs in an Italian bookshop.

David Wilson
LIST OF CONTRIBUTORS

Bob Bewley
Air Photography Unit
RCHME – NMRC
Kemble Drive
Swindon SN2 2GZ
e-mail: swincsd@rchme.gov.uk

Otto Braasch
Matthias-Hoesl-Str 6
D-84034 Landshut
Germany
e-mail: 100140.3262@compuserve.com

Marilyn Brown
RCAHMS
John Sinclair House
16 Bernard Terrace
Edinburgh EH8 9NX

Anthony Crawshaw
15 King’s Staith
York YO1 1SN

Alison Deegan
Air Photo Services
76 The Green
Lynham
Wilts SN15 4PG
e-mail: 101535.3441@compuserve.com

John G B Haigh
Department of Mathematics
University of Bradford
Bradford
West Yorkshire BD7 1DP

John Hampton
5 Lindsay Close
Epsom
Surrey KT19 8JT

David Kennedy
Dept of Classics and Ancient History
University of Western Australia
Nedlands
Perth
Western Australia 6009
e-mail: dkennedy@arts.uwa.edu.au

Rebecca Moloney
RCAHMS
John Sinclair House
16 Bernard Terrace
Edinburgh EH8 9NX

Wlodzimierz Raczkowski
Instytut Prawistorii
Uniwersytet im A Mickiewicza
Sw Marcin 78
61-809 Poznan
Poland
e-mail: WLODEKRA@hum.amu.edu.pl

John Samuels
John Samuels Archaeological consultants
The Manor
South Street
Normanton on Trent
Newark
Notts NG23 6RQ

David Wilson
CUCAP
Mond Building
Free School Lane
Cambridge CB2 3RF