AARGnews 13

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Hungarian holiday snaps

Top left: Pete Horne demonstrating how to take oblique photographs.

Top right: Chris Musson, Bob Bewley and Otto Braasch at the final debrief. Daily GPS traces in background.

Centre right: Otto hiding from the press.

Centre left: Rimas Zvirblis and others during ground school pondering AERIAL.

Lower: Zsolt Visy, our man in Hungary, without whom chaos would have reigned.
EDITIORIAL

This year AARG made the final leap across the Atlantic and acquired at least one US member. This is Tom Baker who was discovered by (I think) Michael Doneus while poking about on the internet. Tom has a newsletter on the net which includes such gems as ‘the secret of aerial archaeology’ as well as news of his recent and current projects. As we know, things are done differently over there. Have a peep in http://www.nmia.com/~jaybird/AANewsletter/

With the addition of Kevin Jones (see this issue and, in person, at AARG) our antipodean membership has doubled. David Kennedy had been lurking in Australia for several years now, although he frequently pops up on the internet. He is still actively working on Middle Eastern archaeology (see AARGnews), and has recently been chasing information about the newly released high-resolution satellite images. Recent information on these is presented by Martin Fowler in this issue and – I think – is relevant to the work of all of us.

Otto Braasch’s Hungarian training school was a huge success and is to be the subject of a formal note elsewhere (possibly Antiquity). For AARGnews browsers we provide some of the official and unofficial statistics as compiled by Cathy Stoertz. In the space of a week some 30 participants (ranging from senior archaeologists to genuine students) were shown the possibilities and potential of aerial reconnaissance and introduced to some of the resulting on-ground work. While admitting that I had a wonderful time as one of the staff and would willingly give up another week of my time to do the same thing, the Palmer in me wonders if this really is the right way to do things.

There is no doubt that flights in a light aircraft at the right time of year are a good way of showing people the range of archaeological features that is visible from the air. There is no doubt (to me) that we proved that any archaeologist – perhaps even any person – armed with any camera can take working photos from the air if there is an experienced pilot to put the aircraft in the right place, point, and say, “There.”. There is no doubt that any archaeologist, student or professional, can trace off a few lines from an AP, create a network, and transfer these details to a map. But there are doubts – which apply equally well to the way we do things in the UK – about the general process of archaeological reconnaissance. Is, for example, the 1930s method of whizzing about in a light aircraft and taking obliques still the best way of doing things 60 years later? Is it sensible to begin airborne reconnaissance anywhere without first finding out what is known and checking existing records (such as verticals and – now – high-resolution satellite images)? Should any photographs be taken before finding out why they are wanted, what is to be done with them, and – most important – the requirements of the photo interpreter?

I throw these questions at you to suggest the need to think before we fly. Do we really need more illustrative shots for publication – which are likely only to be yet another old (well, maybe new) crop mark? We have thousands already. Or more slides for lectures – which do little more than satisfy the apparently essential need of the aerial photographer to show off this year’s snaps. Or would it perhaps be more sensible to jump into the 1990s and take photographs that can be used for archaeological interpretation and mapping, in which case, why not use verticals? And finally, might it be because we persist in these amateur techniques (and remember that all but one of our past masters were amateurs) that we only attract amateur levels of funding? Is it possible, do you think, to approach aerial photography more professionally?

Finally, I must thank Cathy Stoertz (age 40-something) for her witty piece aimed at putting me into my 50s. Of course RCHME get much of my criticism because – as far as I am aware – they are the only other people in England who do anything [if that makes sense]. In the early issues, Chris Cox was on hand to censor out the most offensive bits, but things move on…. So, while I may try to be good in future (and you can already see that my next target is the airborne mob) I am determined to keep my real age round about 18.
CHAIRMAN'S PIECE

Marilyn Brown

This September sees the end of my three years as chairman of AARG, a time which I have greatly enjoyed, and I hope that my successor has the same pleasant experience. Looking back over my period of office, the element which stands out as the most memorable has been the fostering of aerial reconnaissance throughout Europe, and the two-way communication of innovations and discoveries there and in Britain. Much of the impetus for this development has come from the determined efforts of Otto Braasch. The increase in the number of overseas members, now standing at almost a quarter of the total, is an indication of this progress. The conference on Aerial Archaeology in Eastern and Central Europe in September 1994 brought together those with an interest in the gathering of aerial data and those who saw the need to utilise it. The links formed at the Potsdam meeting have been continued with visitors to Britain from countries ranging from Slovenia to Poland, and visits from British members of AARG covering a similar range. The week-long course in the practical aspects of aerial reconnaissance held in Hungary in June 1996 provided another contribution to this process. The efforts of various members at the first conference of the European Association of Archaeologists have led to the inclusion of a session on aerial archaeology in the second conference to be held at Riga in Latvia, where several members of AARG from Europe (including Britain) will address such subjects as the impact of aerial reconnaissance on the development of the archaeological landscape and the relation of reconnaissance to other methods of prospection.

In Britain, over the last three years, the picture presented has not been one of regular progress. Cuts in funding have hit all three Commissions and many local authorities, affecting not only the money available for reconnaissance and mapping internally and in the regions, but also making it difficult to plan coherently in the short and medium term, let alone on a longer basis. The lost opportunities for reconnaissance now may result in sites not only unrevealed for another forty or fifty years, but destroyed entirely unrecorded. The loss, diversion or non-replacement of experienced staff will have an unfortunate and long-lasting effect on the progress of aerial archaeology.

On a more cheerful note, reconnaissance has continued across Britain with good and bad years experienced in different parts of the country. Still, in most areas, there is no evidence of diminishing returns in terms of numbers of previously unrecorded sites. The integration of archaeological information derived from aerial photographic sources with that from other methods of survey and research has been a consistent aim of those concerned with aerial reconnaissance. The work of the Institut fur Ur- und Fruhgeschichte in Vienna has set particularly high standards. The development of GIS-related systems has been particularly relevant to the dissemination of aerial data in digital form, and, it is to be hoped, that wider and more general comprehension of the aerially-derived information will follow.
AIR ARCHAEOLOGY TRAINING PROJECT IN HUNGARY
Balatonkili 15 – 21 June 1996

Official course statistics

37 participants (staff and students) from 14 countries:

8 Hungarian
4 Slovakian
3 Slovenian
3 Romanian (2 fliers, 1 earthbound)
3 German
2 Polish
2 Czech
2 Lithuanian
1 Estonian
1 Croatian
1 Austrian
7 combined British (4 English, 2 Welsh, 1 transplanted American)

Aircraft time:

<table>
<thead>
<tr>
<th>Pilot</th>
<th>Aircraft</th>
<th>Sorties</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otto Braasch</td>
<td>BC</td>
<td>17</td>
<td>42 hrs 29</td>
</tr>
<tr>
<td>Klaus Leidorf</td>
<td>QK</td>
<td>11</td>
<td>32 hrs 01</td>
</tr>
<tr>
<td>Anthony Crawshaw</td>
<td>MJ</td>
<td>13</td>
<td>29 hrs 20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>41</strong></td>
<td><strong>103 hrs 50</strong></td>
</tr>
</tbody>
</table>

(Assuming there were 4 people in each aircraft for each flight, this makes a total of 415 hrs 20 ‘person hours’ of flying time.)

**Total films** 224
**Total frames** 8288

Approximately 330m of film was exposed which, according to our calculations, is enough to land an aircraft on - although we must stress that this is not recommended practice - or enough to reach from the hotel to the restaurant and almost all the way back, a characteristic also possessed by some of those assigned to afternoon Ground School.

**Greatest amount of flying time** (16 hrs 31) – Daria Grosman, Branko Kerman and Ants Kraut

**Most promising beginner photographer** – Zbigniew Kobylinski

First ‘loss of composure’ – Chris Musson (15 June)
Greatest ‘loss of composure’ in a single flight – Joze Hanc
Most regular ‘loss of composure’ – Gabor Bertok
Greatest number of victims – Otto Braasch
Fewest victims – Anthony Crawshaw
AIR ARCHAEOLOGY TRAINING PROJECT IN HUNGARY

Special achievement awards

A Group Prize is awarded to all participants for the widest variety of camera equipment assembled in one place.

Most economical use of a film – demonstrated by Rimas Zvirblis

Best multi-media production – Klaus Leidorf

‘Ornithology’ prize for the greatest number of photographs of non-archaeological subjects – Rog Palmer

Best sun-tan achieved while (ostensibly) working – Bob Bewley

Special thanks to the Pan-European Taxi Company: Grosman, Kerman, Potrebica, Raczkowski, Doneus and Gojda, proprietors – additional translation services by Daria Grosman; special guided tours to places of cultural interest by arrangement with Hrvoje Potrebica

Most fearless use of foreign languages – Toby Driver

Technology Prize for assembly of a single working computer system from the greatest number of incompatible parts at short notice – Pete Horne, Toby Driver, Michael Doneus, Rog Palmer and Zsolt Visy

Extra special thanks to Zsolt Visy for behind-the-scenes organisation and support (accommodation, personnel, photocopier, computer hardware, films) without which none of this would have been possible. Zsolt’s efforts on our behalf were so great that he single-handedly created a crisis in the Balaton tourist industry by buying up every film within a 100 km radius of Siofok.

Mata Hari Medal for formation seduction of a military officer for archaeological purposes – Csilla Aradi, Csilla Zatyko and Zsusza Miklos; with Special Decoration for Flying Spectacles – Csilla Zatyko

Rog Palmer has made a confidential award for Best Pullover (winner to be announced and prize to be delivered privately at a later date).

Grand Order of the Dinosaur, for pedantic insistence that course participants must think about Archaeology, Interpretation and Mapping, when all they really wanted to do was go flying and take photos – awarded jointly to each other by Rog Palmer and Cathy Stoertz.

But more seriously: as a result of the training week Otto was commissioned to undertake reconnaissance in Poland. Zbigniew Kobylinski, Chief Inspector of Archaeological Heritage, has offered summarise this, and other Polish aerial survey, in a forthcoming note for AARGnews.
The Development of Aerial Photography in New Zealand Archaeology

Kevin L. Jones

Abstract
General aerial photographic coverage of New Zealand coastal districts (where most archaeological sites are found) was completed by the end of World War II. Systematic use of aerial photography for reconnaissance, as an aid in field survey, for mapping, illustration, and analysis, and for the measurement of rates of deterioration or destruction of archaeological sites commenced in the late 1950s. The Maori (Polynesian) earthwork fortifications of New Zealand, known as pa, lend themselves to both vertical and oblique aerial photography. Other types of site for which the medium is useful include horticultural plots demarcated by trenches or stone rows, storage pits and, from the nineteenth century, early farming and industrial remains.

Introduction
Aerial photography is most conspicuously of use in discovering or revealing patterns that are not readily discovered in the ground view. Archaeologists use this capacity to reveal pattern in several ways: simply to illustrate; to assist in fieldwork; to gather data cheaply and efficiently - and for further analysis; and finally, as an archive from which what has been lost in the field can be recovered, and to determine rates and causes of destruction.

Shadow or relief marks of fortifications and horticultural sites have been the stock in trade of aerial photography in New Zealand archaeology. Soil and cropmarks (Wilson, 1982: 39-70) feature relatively little. This lack is the result of complex factors including: the generally pastoral character of New Zealand agriculture, the few areas of harder or gravelly subsoils in the warm temperate or northern regions of New Zealand, the regions with the highest density of Polynesian settlement, and the lack of annual grain crops in those areas. Although in New Zealand there are the usual textural and colour changes between generally dark topsoils and lighter-coloured subsoils, the broader contrasts in soil texture, fertility and moisture retention are not as marked as they are, for example, in the chalk downlands or Pleistocene gravel terraces so much a feature of southern England (Gorbey, 1967; Wilson, 1982; Riley, 1983). A ploughed out trench dug into a New Zealand subsoil (for example a volcanic ash) would have little ability to retain moisture and only marginal increases in fertility compared to the surrounding soil. Until the nineteenth century, there were no solid foundations; Maori structures were wooden and gained rigidity by placing posts in relatively small holes.

Moreover, the time depth of New Zealand pre-European history, now generally thought to be little more than 800 years, means that there is less opportunity for the successive patterns of occupation, accompanied by repeated cycles of destruction, that in Europe can only be revealed by cropmarks. The generally smaller pre-European population in New Zealand also contributes to this relative lack of complexity in the record of cropmarks.

The distribution and visibility of earthwork sites varies with climate, vegetation and land use factors (Fig. 1). Few pa (fortifications) show south of the ‘pa line’ from the Manawatu.
Figure 1. Map of New Zealand showing places and regions mentioned in text.

across to the Wairarapa coast at about 40°S: 6,351 pa lie north of this latitude and 210 south of it (Walton, 1995, pers. comm.). This line reflects the general southward reduction in population density late in pre-European history dictated by the marginal horticultural conditions south of about 42°S. In favoured coastal terrace lands, however, pa occasionally do achieve the landscape prominence of their northern counterparts - for example, the complex of pa on the Kai Koura (Kaikoura) Peninsula in southern Marlborough (Brailsford, 1981: 116-131; Jones, 1994: 220-221).

New Zealand, being in the zone of westerly cyclonic weather for much of its latitudinal range and remote from continental influences, seldom has stable weather. However, periods of up to two days without cloud are not uncommon as high pressure systems cross the country. Significant differences in cloud cover will occur between eastern and western districts in the course of the cycle of high pressure. Although a haze created by high humidity can be a problem in northern districts, smoke or dust haze is uncommon; amongst landscape artists, New Zealand has long had a reputation for harshness or clarity of natural light.

PART I

Archaeological applications: a review

In 1924, New Zealand took up an offer of surplus British military aircraft and the nascent New Zealand air force (a branch of the army) was set up. A decade later, the air force purchased cameras (Stephens et al., 1991: 16-40), probably F24s. From 1935, civilian companies also began to play a role in aerial photography, notably the Hawke's Bay company, New Zealand Aerial Mapping Ltd. The war showed the alarming lack of any form of photo reconnaissance in the Pacific (Stanley, 1982: 65). New Zealand (staging post for U.S. Marine Corps) and the island fronts in the Pacific were high priorities for coverage. Comprehensive coverage of New Zealand, largely carried out by New Zealand Aerial Mapping, Ltd., was not completed until the early 1950s. Figure 2 is a vertical air photograph of a pa in the Gisborne district photographed in the course of a survey of flood damage in 1948. The company's long-term commitment to the Crown was for the baseline vertical photographs needed for the inch-to-the-mile topographical mapping (the N.Z.M.S. 1 mapping series, now superseded by the 1:50, 000 N.Z.M.S. 260 metric series). This early coverage, now converted to positive film images from the old nitrate stock, is invaluable to archaeologists.

The earliest application of aerial photographs to New Zealand archaeology was by Geoffrey Blake-Palmer who had made the acquaintance of O.G.S. Crawford before the war. A stimulus to his interest may have been a knowledge of wartime aerial reconnaissance. He served as a Major in the Second New Zealand Expeditionary Force in North Africa and the Italian campaign, writing books or booklets on Libya, Rome, Florence, and Italy generally (Blake-Palmer, 1945; Bagnall, 1969: 139) and was involved with the listing and rescue of ancient monuments in Italy later in the war (Gathercole, 1996, pers. comm.). He was President of the New Zealand Archaeological Association from 1963 to 1965.
Figure 2. Whenuanui, a pa, upper Waipaoa River, East Coast. A fragment of high terrace has been fortified by a perimeter scarp and ditch; at top, a narrow point provides an interior defensive citadel created by two short lengths of transverse ditch and bank. Some of the shallow, rimmed depressions may be house floors but most are 'raised-rim pits'. The site is probably 200-400 years old. The main pa is about 220 m long. Photo credit: Land Information New Zealand, SN 521, RN A/15, 6.7.48.
Drawing on Crawford (1924), Blake-Palmer (1947) usefully summarised a number of technical factors such as seasonal and diurnal lighting factors and the body of vertical aerial photographs that existed at that time. Published for the first time, these vertical photographic images of pa (from the Crown Copyright files of New Zealand Aerial Mapping, Ltd.), such as those from Papamoa, Bay of Plenty, must have been very exciting for his peers in the Polynesian Society. Alas, his paper was before its time. There were no professional appointments in the universities until the mid- to late-1950s and only a little work in the field was done out of museums. Leslie Lockerbie, pre-eminent pioneer of archaeology at the Otago Museum, published what is evidently a purpose-flown (showing the tents of the Otago Museum ‘expedition’ of 1955) oblique photograph of the setting of the Hawksburn site, Central Otago (Lockerbie, 1959: plate Va). Also in this period, work by gifted amateur scholars with an interest in historical topography used oblique aerial photographs (e.g., Kelly, 1951) - a practice that has lasted (Spencer, 1983; Phillips, 1989).

Soon after the founding of the New Zealand Archaeological Association in 1954, under the guidance of Jack Golson (first lecturer in archaeology at Auckland University), Roger Green and the late J.D.H. Buchanan (1902-1961), a site recording scheme was put in place. Today the scheme, with 47,000 records, provides the foundation of statutory protection functions and is the principal scheme used for recording in government agencies; it is also open to volunteer site recording.

The New Zealand Archaeological Association's first annual conference 'made suggestions for the national air cover to be made more accessible for study by private research workers' (Golson, 1956). Aerial photographs were also discussed at the 1958 conference of the association. An explicitly positivist scientific approach was espoused in which interdisciplinary studies drawing on soil science and palaeoecology were prominent. Professor D.W. McKenzie, Geography Department, Victoria University of Wellington, gave a paper on aerial photographs and field archaeology (Green, 1995: 48). Indeed, the contribution of geography and geology in the training of archaeologists cannot be too much stressed, if one is seeking to understand the broad facility with which aerial photographs are used by archaeologists. Amongst the topics of interest at this time was the pattern of pre-European burning of forests, established from aerial photographic records (McKelvey, 1958; see also Jones, 1994: 38-39). Burning of mature forest, which may have taken up to a millennium to reach maturity, leaves a distinctive pattern of shrubland and early succession forest which can be traced in aerial photographs. Although much scientific material from that conference appeared in the New Zealand Science Review for 1958, only the paper on forest pattern was clearly based on aerial photographs.

In 1957, Jack Golson expounded many theoretical issues in field archaeology, site nomenclatural and settlement pattern arguments. With reference to O.G.S. Crawford's work, he extolled the value of aerial photographs (Golson, 1957). Blake-Palmer is known to have lectured the Wellington Archaeological Society in the early 1960s on the topic and he also encouraged the Otago Anthropological Society and Peter Gathercole to engage in some aerial photography (Gathercole, 1996, pers. comm.).

Aerial photographs received great stress in the first edition of the New Zealand site recording handbook (Golson and Green, 1958: 29-40) with Bradford's (1957) Ancient Landscapes and other Americanist examples mentioned as a useful guide in interpretation. The handbook's recommendations were based in large part on experience earlier gained on a survey of the South Kaipara Harbour vicinity by the Auckland University Archaeological Society. Existing vertical photographs were used for reconnaissance and preliminary mapping, later completed by field survey (Groube and Green, 1959; Rowell, 1960; Green, 1995).

At this period, too, J.D.H. Buchanan of the Historical Section of the Hawke's Bay Branch of the Royal Society of New Zealand worked through the aerial photographic records of New Zealand Aerial Mapping, Ltd. (Van Asch, 1994 pers. comm.). Buchanan was a Cambridge-educated graduate in Chemistry, Geology and Mineralogy who taught at private schools in Hawke's Bay and, after 1952, in Wanganui. He may have encouraged the company in 1949 to take
a series of forward-looking, oblique aerial photographs (taken through the bombsight of a Beechcraft AT-11, a trainer-bomber) of the pa of the extraordinary historical landscape of Hawke's Bay. In 1936, Piet Van Asch, the principal of the company, had trained with Aerofilms, Ltd., and brought back an aircraft from the United Kingdom at that time. This collaboration bore fruit in a work prepared by D.R. Simmons (Buchanan, 1973).

The 1960s was a boom decade in New Zealand amateur archaeology, stimulated by Golson's insistence on archaeology as a source of knowledge independent of Maori tradition and Roger Green's promotion of an explicit settlement pattern methodology and field programme. Some comparative work on regional and district variations in the form of pa was undertaken (Green, 1963; Green, 1995: 1). Low-level aerial photography was used to document the excavation of Taniwha pa in the Waikato lowlands (Law and Green, 1972). Alastair Buist's (1964) monograph, *Archaeology in North Taranaki* first published low-level oblique aerial photographs by Buist himself of a suite of pa, with a text and maps analyzing site typology (based on Golson's early work) and site distribution on the terrace landforms of this district. Based in south Taranaki, Buist also photographed many sites there, some of which

![Figure 3. A pa with many platforms on a fragment of high terrace on the Patea River, south Taranaki. Several segments of double ditch and bank defend a central platform. Outlying ditches defend the leading ridges. The casts of rectangular storage pits line the well drained edges of the platforms and the central defended ridge line. Photo credit: Alastair Buist.](image)
have been published (Buist, 1976; Prickett, 1990; Jones, 1994). Figure 3 is an example of Buist's work.

Just to the south, in a district west of Wanganui, Colin Smart (1962) conducted an extensive survey using existing vertical aerial photographs. He also took to the air and made many oblique aerial photographic records. Selected sites were mapped by projection through an epidiascope with details corrected or added on a subsequent field trip. This work was never fully reported but the records and copies of photographs have recently been deposited with the Whanganui Regional Museum. Other records are with the Alexander Turnbull Library, Wellington.

Submerged in the largely unpublished strata of the early 1960s was significant aerial photographic work by Les Groube, an assistant lecturer at Otago and later Auckland University, in Hawke's Bay (Groube, 1964: 260; H.M. Leach, 1993 pers. comm.); by the Royal New Zealand Air Force at the Waikato complex on the central volcanic plateau; and by the late Ormond Wilson, chairman of the New Zealand Historic Places Trust, at Te Porere, where Te Kooti Arikirangi, a religious and political leader, fought his last battle with colonial forces.

In the far south, Hardwicke Knight, a professional medical photographer, working with Peter Gathercole (first lecturer in prehistory at Otago University) was busy on the Otago coast (Knight and Gathercole, 1961; photographs in Brailsford, 1981: 221-228 and Jones, 1994: 80-81). Hardwicke Knight had been in the Royal Air Force prior to the War: 'I was initiated into air photography of archaeological sites in southern England because a couple of flying officers in the O.G.S. Crawford tradition found it interesting to have an objective, and I was an enthusiastic rear cockpit airman. The apprenticeship, if one can call practice that, was with the camera-gun which photographed the accuracy of one's machine-gun fire on the fuselage of another `plane, comparatively dull stuff' (Knight, 1996, pers. comm.). Generally, he flew at quite low altitude, 1,000' (Knight, 1966: 337), using a quarter-plate camera. Amongst other subjects were open excavations at Huriawa Peninsula, just north of Dunedin, umu ti (earth ovens showing as rimmed depressions up to 8 m across (Knight, 1966), pre- and post-ploughing photographs of moa-hunter umu (earth ovens) at Waitaki River mouth (Fig. 4) (Gathercole, 1996, pers. comm.) and, working with Les Groube, early morning and late afternoon ground photographs of garden trenches in the Bay of Islands. Gathercole and Knight also used British Admiralty aerial photographs on the 1964 Pitcairn Island Expedition (Knight, 1966, pers. comm.).

Following Les Groube's lead, in the mid-1960s, Jean Kennedy and Helen Leach, founding members of the Otago Anthropological Society and students at Otago University, surveyed the unique Bay of Islands historic landscape, using existing aerial photographs to plot site locations and to analyse and identify sites recorded by the French expedition of 1772 under Marion du Fresne (Kennedy, 1969). This was an important milestone in the 'direct-historical' approach much discussed at that time as an avenue for understanding of late pre-European and contact period Maori settlement pattern.

By the late 1960s, there was some formalisation of the contribution that aerial photography could make to New Zealand archaeology. By this time, there had been ten years of fairly solid work utilising aerial photographs by both the university departments with archaeological specialities (Auckland and Otago). Ken Gorbey (1967; 1970) discussed the nature of New Zealand soils and the reasons why cropmarks are few. He concluded that this phenomenon resulted from the poor contrast between topsoils and subsoils, drawing the obvious lessons from the English experience of alluvial and chalk lowlands. In New Zealand, such soils with extensive pre-European settlement are almost non-existent. The Pleistocene gravel alluvium of the South Island's Canterbury plains, New Zealand's main cereal growing region, had relatively little settlement, although occasional soil marks of earth ovens are known.

Gorbey also experimented with the use of infra-red film, and found highly contrasting edges for swamp pa in the Waikato (Gorbey, 1967: 173). Later, Gorbey became director of the Waikato Museum of Art and History. In 1980, Steve Edson and Kees Sprenger of that museum with the financial support of the New Zealand Historic Places Trust undertook an oblique aerial
photographic survey of many pa in the Waikato region; this followed an earlier collation of the existing vertical photographs (Edson, 1980; photographs in Jones, 1994: 13, 90, 116).

Subsequent works in which the authors use aerial photographs for illustration of pa are papers and a book on the fortifications of Taranaki by Nigel Prickett (1980, 1982, 1990); Barry Brailsford’s (1981) The Tattooed Land: The Southern Frontiers of the PaMaori, a study of pa in the South Island; and F.L. Phillips' (1989) Nga Tohu a Tainui; a Geographical Record of Tainui Traditional History (a study located in the Bay of Plenty, Waikato and Taranaki). In Hawke’s Bay, Aileen Lady Fox's (1978) Tiromoana monograph has a superb oblique photograph of that site and she also used the early R.N.Z.A.F. aerial photographs in her analysis of Otatara pa (Fox, 1980).

Part II, covering some archaeological examples, the use of aerial photographs for analytical purposes and the bibliography, is in the next issue of Aerial Archaeology Research Group Newsletter.
THE COMBINED METHOD OF AERIAL RECONNAISSANCE AND SURFACE COLLECTION
Martin Gojda

Introduction
One of the most typical features of advanced archaeologies in approximately the last two decades is a growing awareness of the importance of application of non-destructive methods in the field-work parts of complex archaeological projects. This tendency is symptomatic of the period of reassessing principal paradigms in archaeology which, being influenced by global social and science/research trends, started to look for ways of its own transformation which would enable archaeology to display its meaning within modern society. One of the most visible shifts of the transformation is the orientation of current archaeology towards the study of large spatial units. These can be defined either as naturally bounded landscape territories (for example river basins or geomorphological units) or as areas around important local settlement sites which are explored with regard to their mutual relationships (centre – periphery, catchment areas of hillforts, villages and their field systems, etc). Whilst in the latter case different methods of (not only) archaeological investigation can be applied, surveys of naturally bounded units, which are not ‘affected’ by the existence of a settlement determinant, offer the possibility to apply systematically, independent sample methods. Although the application of non-destructive methods has different levels, it is obvious that once archaeology tends to analyse large spatial units (landscapes), rather than single landscape points (sites, features), a massive application of non-destructive prospection methods operating in large spatial units must inevitably prevail.

In Bohemia over the last two decades various non-destructive methods have been applied in a continuous way but in a limited range. Considering just the level of landscape survey, there are two principal methods at hand: aerial reconnaissance and surface collection (plough walking). During the 1990s both methods have been frequently used by Czech archaeologists. Moreover, theoretical studies on the conceptual application of spatial (landscape) non-destructive methods, results and experiences have recently been published (Kuna 1994; Vencel 1995).

Traditionally, each of the methods was applied separately, sometimes in combination with non-destructive methods of mapping buried structures of particular sites (for example, a geodetical-topography survey, geophysics or phosphate analysis, etc.). Whilst in some countries projects on landscape history have critically evaluated data from both the surface collection and aerial survey, in Bohemia no effort has been made to combine spatial non-destructive methods of prospection in one project (on a small scale this was the case of the ‘Ancient Landscape Reconstruction in Northern Bohemia’ project, cf. Zvelebil, Beneš and Kuna 1993; Gojda 1993a). The opinion that only excavations can properly (better say, exclusively) verify results achieved by those methods still prevails among most archaeologists.

The commencement of the programme of aerial archaeology in Bohemia at the beginning of this decade provoked the need to formulate its aims, and to look for the ways through which such aims can be achieved (Gojda 1993b). We had the opportunity to choose different ways of assessing the gathered data. Although we certainly do not exclude the need for specific excavation of air-surveyed features which previously have not been known and/or occur repeatedly, we have chosen the strategy which is based on gaining as much information from non-excavated sites and features as possible. Thus our preferred method combines aerial reconnaissance and surface collection. We soon became aware of the possibility of using the new information as a source which can contribute to the study of theoretical problems. New data gathered during the aerial and field campaigns in central Bohemia
can be used for various kinds of spatial studies. In the following I have tried to analyse the location of settlement sites in geomorphological terms, and also to evaluate the character of surface pottery collections from sites identified from the air.

Collection of pottery samples from plough-walking: evaluation

The project, based on the application of post-reconnaissance plough-walking on archaeological sites identified from the air, was carried out from 1992 to 1995 as a part of the Aerial Archaeology Programme of the Prague Institute of Archaeology. The principal reason for beginning a project like this was a methodological one. Having no practical experience in aerial survey and in distinguishing buried crop- and soil-marked features of archaeological origin from natural or present-day activities we needed to verify the nature of those sites identified from the air (our thanks must be expressed to O. Braasch who is the main consultant in this matter).
Then we realised that for any kind of further application of the newly gathered data it is necessary to have them dated.

The surface collection campaigns took place in the early springs and early autumns of 1992 to 1995 on 61 sites in central Bohemia (Map 1). The technique of plough-walking illustrated in Figure 1 was generally used. The most frequent item of surface-collected material in central Bohemia is pottery. After field campaigns, pottery fragments, and occasional stone artefacts, were processed in a laboratory and their date determined by six specialists in prehistoric and medieval pottery. Finally, we could prepare a database which was a starting point for our assessment and analyses.

Figure 1. Technique of plough-walking on a site. Information from photographs taken at different times is combined to form one site: 1. Crop-marked cluster of features, 2. Edge of local erosion, 3. Single ploughed-out (soil-marked) features, 4. Walking line.

Some of the most important correlations between various aspects of gathered samples are displayed in Diagrams 1 to 4. They indicate that in most cases the plough-walking of a site resulted in the collection of 1-10 (14 times) and 11-20 (10 times) fragments. Occasionally more than 100 sherds were gathered (4 times). We can also try to correlate the quantity of pottery fragments with the percentage of identifiable sherds in one unit (site). We come to the conclusion that the higher the number of fragments the more favourable is the ratio between identifiable and unidentifiable pottery. Generally speaking, in average site collections (of about tens sherds) the quantity of significant fragments usually amounts to 15-25%. We can also see another general tendency: the bigger the pottery fragments, the more that can be identified.

Important is also the assessment of the ratio between the weight of single collections and their date. Most sherds from pottery units are dated to the Bronze Age (dominantly to late and final phases) although these are frequently mixed with material from later periods (mostly from the Iron Age and Roman period). Neolithic sites never show evidence of Bronze Age activity. Either they were exclusively Neolithic or were settled much later (in the final prehistoric phases and/or early medieval period).

**Sites and their setting in the landscape**

Understanding the relationships between human settlement and environmental components is an important theoretical objective of archaeology in many countries. Its study has been intensive in the last three decades following the large-scale invasion of natural-science methods into archaeology. These made it possible to study systematically the relationships between the social and natural environments in the past (human ecology, environmental archaeology). However, the scientific method used in such studies was criticised recently by natural scientists themselves, who now try to introduce an approach termed ‘ecodynamics of human-modified landscape’, or briefly ‘human ecodynamics’: McGlade 1995).

Many different points of view must have been taken into account by our prehistoric predecessors when they looked for the best place to settle although, until recently, archaeologists considered these decision-makings just in a pragmatic way. It was function (eg, economy, communication, or defence) that used to be considered as a principal, or even the only, criterion in those times and was especially apparent when concerned with fortified sites placed on strategic landscape nodes (promontories, headlands, hills, etc.). Recent studies based on long-term landscape projects allow us to us to think, in a realistic way, that social and
symbolic aspects could also have played an important role in making decisions about the location of a settlement (as Kuna (1994, 84-85) suggested for some Bohemian promontories). A symbolic aspect connected with the construction of fortified sites also has been discussed recently on a theoretical level (Neustupný 1995, 650). The significance of a symbolic aspect has generally been recognised in the case of sites connected with funeral practice and cult. The advantage of our data is that they were collected, almost since the beginning, with the intention to apply them in a specific kind of study. We wanted to look at the location preferences of prehistoric and early medieval sites in Central Bohemia and to evaluate the setting of these sites from the geo- and hydromorphological points of view. Of the 61 plough-walked sites which had been identified from the air as settlements of varied quantities of maculae, 49 produced artefacts. When analysing site locations in Central Bohemia it was possible to define eight characteristic types. These are shown schematically in profile in Figure 2 (where type 1 – valley floor – is an additional one, which was frequently used in prehistoric Bohemia although no site was recorded from the air on it) with examples in plan in Figures 3 and 4.

Diagram 5 displays the frequency of occurrence of settlements on these location types. It is obvious, that most sites recorded by the combined method of aerial reconnaissance and surface collection are situated on type 4 locations (16 – 33% – altogether). Looking at the frequency of use of each type of location we can say that (taking...
no chronology aspect into account) the pattern more or less corresponds to the trends generally evidenced in Bohemian prehistory.

To assess any changes in preferred settlement location at different periods it is essential to have the sites dated. Pottery from surface collections can serve relatively well in dating the sites discovered from the air. Although the total number of plough-walked sites is too low for worthwhile statistical applications, it is adequate to allow the analysis of the occurrence of prehistoric cultures on location type 4. A setting like this was common between the Neolithic and the Early Middle Ages, but it is the period between the Middle Bronze Age and the Late Hallstatt/Early La Tène (Celtic) Ages when this type of location was most frequently occupied. We can also support the observation from other regional studies that settlements of the La Tène period usually do not occur in flat lowland areas (type 2).

Conclusion

Because of the relatively low number of sites analysed, the interpretation of the striking preference of site location type 4 may be misleading. Results to date make it impossible to judge which were the decisive aspects prehistoric communities considered most important when establishing their settlements. We can question the ways in which relatively small topographical differences may have affected the locational preferences of the prehistoric farmers who settled many central Bohemian regions, but we can hardly assess their vision of the landscape. They may have seen their environment as more dynamic, or even more dramatic, than we can. Their views must have been conditioned by the state of vegetation cover and by the state of the riverine and stream meadows. Consequently, the settlement distribution could have been structured on the basis of very different reasons, and values, than our present view of the same landscape allows to imagine.

Finally, we can argue that surface collection increases the value of results from aerial
Figure 3. Setting (location) of air-surveyed and plough-walked sites in the landscape (central Bohemia): I.

Figure 4. Setting (location) of air-surveyed and plough-walked sites in the landscape (central Bohemia): II.
More on Technical Pan

Rog Palmer

Following my earlier note (AARGnews 11, 33-34) I have now settled on a satisfactory exposure and processing regime for Technical Pan. Film has been exposed at 100 ISO using yellow filter only if it gets hazy (although there’s no reason why it could not stay on full time).

Processing of 35mm film has been in ID11 (apparently identical to Kodak’s D76) diluted 1+1 for 8½ minutes at 20C. I give ten inversions when the developer is first in, followed by five every 30 seconds. This produces negs which are printable, without too much fussing about (ie with the brain on ‘auto’), throughout the tonal range.

If I was RCHME (which thankfully for all I’m not) I’d insist on grant recipients using this film.

References


THOUGHTS ON HEARING THE FIRST CUCKOO OF SPRING

A personal response to bits of AARGnews 12 - by Cathy Stoertz, aged 43¼

Late March: the vernal equinox; the clocks go forward; the rain is warmer; the daffodils are in bloom; the first coach-loads of French schoolchildren arrive in Bath; AARGnews arrives on the doorstep - it must be Spring!

The most refreshing thing about AARG is the remarkable lack of professional one-upmanship and personal axe-grinding at our annual gatherings. The atmosphere provides a welcome contrast to some other conferences (IFA in particular) where the furtherance of personal ambition, the jockeying for position in some real or imagined professional steeplechase, is palpable and exhausting. AARG meetings are different: for a few brief days each year, we're all on the same side; interested in the same stuff; impressed with and supportive of each other's work; sharing information, experiences and puzzlements without fear or favour, without looking over our shoulders to see who might be eyeing our seat or our funding. Maybe it's because we're all such decent human beings (?) or maybe it's just that our professional world is so far out on the fringes that nobody sees it as a serious avenue for personal advancement, so we can all relax and pursue a genuine interest for the good of the thing itself...(!)

Our newsletter, on the other hand, has lately begun to develop along more disturbing lines. Plenty of information and ideas exchanged, plenty of thoughts provoked, and yet... Perhaps it's our own fault, sending so few contributions that the Editor has to fill the pages any way he can, but AARGnews seems increasingly to have become Old Palmer's Views, providing a platform from which Rog can snipe with impunity at whatever target takes his fancy. Now I'm not such a sensitive soul that I can't take a bit of healthy debate and hearty disagreement, but I must confess that I'm beginning to find our Editor's tendency to sneer in print at the efforts of others, particularly RCHME, more than a little bit tiresome (then again, I would say that, wouldn't I?).

We are all familiar with Rog's idiosyncratic wit and verbal shorthand; they are part of his own peculiar charm and are intended, at least most of the time, to sting us into thinking beyond the immediate nose-to-grindstone concerns of photo-map-deadline, to engage our brains (I know I left it around here somewhere...). However, I do take exception to his use of these pages to denigrate, repeatedly and without possibility of challenge for at least six months, the work of fellow professionals engaged in the National Mapping Programme. I find this especially exasperating because his comments are based on a persistent and wilful misunderstanding of NMP and its aims, despite extensive discussion and explanation by various people at various conferences and in various bars... But maybe this apparent reluctance to recognise the validity of methods other than his own is just another symptom of Mad Rog Disease. Perhaps he's had one too many Old Cow curries; or is it simply a handful of sour grapes because RCHME wouldn't continue to fund his personal approach to the Fenland (roughly summarised as 'Bugger the specification - I'll do it my way, and you'll be bloody grateful')?

Like the Editor, I am a product of the JNH stable, although I post-date the Golden Days of the Rog by a few years. I learned the fiendish intricacies of the network and proportional divider method; I used the dreaded Stereo-facet Plotter. I spent weeks struggling, with the utmost concentration, to capture every nuance of ditch-width and relationship in infinitesimal detail, only to have John point out some tiny feature at the edge of one frame which I hadn't even noticed. Under John's tutelage I learned to piece together landscapes you could walk through, features you could trip over or fall into or hide behind. I laboured to produce the perfect line on the perfect map, depicting every subtle variation in size and shape, ('all the wiggles, kinks, junction details, entrance forms etc that the photos were capable of recording' - Palmer, AARGnews 11, 21) at the largest possible scale regardless of the ultimate purpose or destination of the product; regardless of whether the maps would ever be used at all. I strove towards the Platonic Ideal. (I can still do the Voice: 'Aaaah - well now...')
The depth of knowledge and experience which John passed on to us during those years is immeasurable. It is the foundation of everything I do in the course of my working life; it informs my approach every time I pick up an aerial photograph. He taught us observation, patience, persistence... and joy. His satisfaction in tracking a small but crucial detail back through scores of photos, to pin down a tricky feature at last, was that of Holmes solving a three-pipe problem, and it was infectious. And even JNH allowed the occasional employment of `visual techniques', albeit always based on sound photogrammetric principles - `The Mark One Human Eyeball is the most efficient measuring machine we have.' (Hampton pers comm, passim, ad lib 1977-85)

But how much of the information contained in our vast and growing collection of photographs was analysed, interpreted and disseminated in usable form during that time? How much could have been achieved by now at that pace, even if there had been more of us and we hadn't had to catalogue the photos and assist visitors as well, and even given the advantage of computer-aided methods? (And what superior claims can we really make for the intrinsic accuracy of 1:5,000 or 1:2,500 plots whose base maps were not infrequently obtained by photographic enlargement, or tracing via zoom-transferscope, of 1:10,560 maps?) (Palmer, ibid and Stoertz, personal experience)

Perhaps in recognition of the drawbacks of large carefully hand-crafted site plans (for that is what they were), JNH instigated our first mapping projects for county SMRs, using the planning departments' basic working scale of 1:10,000, which is (1) a practical scale at which to record large areas of archaeological information in reasonable detail without filling the room with map cabinets; (2) the most practical scale at which to present several square kilometres of archaeological landscape while retaining both its landscape quality and its site detail; and (3) a scale which conveniently allows several people simultaneously to study those landscapes without biffing each other in the face (now there's a thought...) like commuters unfolding newspapers on a crowded tube train. Shropshire and Hereford & Worcester were both mapped by RCHME in the late 1970s, the former using mainly manual techniques, the latter with the aid of the OS digitiser.

That early initiative was taken up by other counties, although for some reason lost (or dropped) by RCHME. By now each SMR has a set of maps showing, in some way, archaeological information derived from aerial photos. Many are adequate, some are brilliant, some are abysmal, some are all three in different places, difficult to tell at a glance which and where, and an appreciable number were compiled in the late 1970s and early 1980s during the formation of the SMRs and certainly need updating by this time.

The National Mapping Programme aims to remedy this situation to a meaningful standard within a reasonable timespan: ie before the middle generation of AARG reaches retirement age! Given the constraints of time, staff numbers and money, it is inevitable that the end product will have had to sacrifice some detail. But building upon the bedrock of considerable collective expertise, both within and beyond RCHME, a useably accurate result is a real possibility. Indeed, computer-aided techniques are by now so user-friendly, and the users so adept, that I suspect very little `sketching' actually takes place any more.

To continue to insist that the necessary sacrifices render the entire exercise less than useless is simply mischievous, producing an amusing degree of flapping and wounded pride among those contributing to the enterprise, but not actually providing a practical solution to the very real problem presented by millions of unused aerial photographs. Surely this hobby horse must be ready for the knacker's yard by now - a fitting substitute for Old Cow, perhaps? (It resembles some form of bovine material, certainly.) The information contained within unexamined aerial photos is only potential information. It just sits there until somebody asks a question. So until Rog can get round to doing it perfectly, the rest of us might as well make a start. In fact, we already have.
AARG CONVERSATION N° 2, part 2:

JOHN HAMPTON and ROG PALMER: 30 JANUARY 1996

Part one of this conversation appeared in AARGnews 12. The afternoon session includes various suggestions on ways and means of beginning to understand the archaeological landscapes that have been recorded from the air. We progressed from my forthcoming task of having to type this out, to using tape recorders in the field, to:

JNH – I’ve always thought it advantageous to have a video, camcorder, and to be able to talk as you actually look at something ... to have the ability to make comments and to illustrate something at the same time.

RP – I’ve only used a video camera once and I got told off for that because I turned it sideways, because I was filming somebody standing up. And people had to watch television lying down! But it would be useful for field work.

Pause to collect thoughts

RP – One of the things I wondered about, and bearing in mind that there has just been this celebration of 30 years of APU, was whether you had any vision, let’s say, when it started, of where it might go? What contribution was the APU likely to make?

JNH – It wasn’t until I read the papers that had been circulated in the Commission that I realised what the intentions were. Initially I was immersed in the mundane things of how could it be structured, how could we have an index of photographs, and I think, fortunately, I happened upon the idea of using the grid reference which I’ve always thought, and still think, is probably one of the best things I ever did. But, having said that, first of all I had to get the ideas accepted by the Commissioners – I did a paper on it, I think, and that went through. But to come back to your wider question about the future – I think the real impact of this didn’t really surface until I’d been in the job about six months. And don’t forget that because I’d been involved in the Ordnance Survey I knew many people in the air survey world. I’d been in the Air Survey in the Ordnance Survey and one of the Commission’s instructions was to build up rapidly a record of monuments, and of towns. So I went round to the various companies, and everywhere I went it was, “John, hello!” So it was rather like an old club – so I really got quite good service. We set up a scheme with about three companies to photograph selected areas. The CBA had produced a list of towns at risk and we got them photographed. And it was achieved on the back of other activities – we got them at a very reduced rate. So that would have been about the first thing I ever did – sometime around 1966.

But it was only then, going round and talking to these people and asking them what photographs they had and looking at their records that I realised that here we’d got the nucleus of an archive of the air photographs of the country. A record of monuments was the primary thing and the second thing was to get an idea of what photographs that there were, or likely to be.

RP – That’s right. We were getting flight traces from ... Meridian ...

JNH – It was only at that stage, within about six months, that I realised that if this was going to go anywhere it was going to have to be big. I went up to a course in Edinburgh, probably in the Autumn of ‘66, and I was talking to somebody who ran the photographs in the Nature Conservancy. He told me that in Canada they were using computers to store the information about air photographs. So, John thinks, “this is what we need” ...

RP – That would be in the old days when computers were all valves and took up a half a building.

JNH – So I went down to NPL and saw a friend of mine and told him what we wanted. And he said, “of course there’s no problem about doing it, but you’ll need an air conditioned room about t-h-i-s size. It’ll cost you about three-quarters of a million.” That was in ... 1966 when three-quarters of a was really quite a sum. I can’t remember what the Commission cost about then.
RP – That was probably before the whole archaeological budget topped one million?

JNH – Oh, well before that – I would imagine we were talking about half a million, or thereabouts, at most. So I came back with my tail between my legs realising that there was I struggling around on a budget of – whatever it was – £10000 a year!

RP – What’s of interest to me was the mapping concept that you brought in. You’ve said to me that from your OS experience you had realised that an air photograph showed an amazing amount of information, that you could pinpoint yourself precisely. I think the example you used was counting white lines down the middle of a road.

JNH – That was another exercise. Before I went into archaeology – and this must have been sometime about 1950 – when I was in air survey you had to do a tour of duty in the field. One of the jobs was picking AP points. You had a vast pile of photographs and had to pick six control points for each photograph so that there was an overlap common to the fore and aft overlap and side overlap. ... So you had to pick a point that could be identified on all those photographs and roughly positioned equi-distant around the edge of the photograph. This was all right in the towns because you could use a corner of walled junction, a drain, crack in the road, intersection of concrete, you know... It was a doddle, you made a little sketch, took some measurements, and that went off so that the trig people could identify it precisely and do their work.

But when you got into the country it was a different ball game all together. So armed with this pile of photographs I was cycling around and wandering through fields trying to find any point that could be used. It was then that I realised the subtlety of the air photograph. I’d never realised it before but now I’m looking at photographs and picking out a bunch of docks on the ground, or even stones you could pick up in certain conditions. Well, you know the sort of thing that you can actually see – and don’t forget always with a stereo so that you could actually see the things. The sensitivity of the photographs impressed me enormously. I knew nothing about archaeology at that stage, other than that it existed, but when I came to look at the air photographs for archaeology all this came back because the subtlety was all there. And the thing that surprised me, and still surprises me to some extent, is that people do not use this background information. We were talking this morning about differing soils – you can jolly well see it on the photographs ... You can follow a line and a pattern and when you get the subtlety of the background soils this is important because this is a factor that leads you to identify how real the image is you’re looking at.

RP – The trouble I’ve found with soils ... I’ve just been doing an assessment near the fen edge at Fordham – the SE Cambridgeshire fens – with particularly nasty geology, you’ve got a lot of sand hills and some of these stripes. They never look the same on two flights running. So what do you map? It’s where, I suppose, your judgement comes in. In this case I’ve mapped the patches of what I consider to be dark soil, because you [the field team] will certainly find those, but be prepared to find stripes and polygons when the surface is stripped. It’s slight guidance I suppose. It’s telling them that when they strip the soil off it’s not going to be like a chalk site – it’s not going to be bare white with archaeology – but messy.

JNH – You remember that paper that we produced jointly that went into Arch Journal all those years ago [1978] and Dorchester on Thames was one of the classic areas. There’s that oxbow of the river – and there you have those bands of silt going across obliterating the archaeology. In essence that’s the pattern that applies to many many archaeological sites – that much is obliterated by overlapping soils. We didn’t show them on the map [Hampton and Palmer 1978, fig 3] but they’re on the photograph [Hampton 1974, fig 16]. That was one of the multi-spectral series.

There followed a brief diversion to look at that map, and hunt the photograph, and to check on recent claims that the APU had found ‘new’ hut circles at Dorchester on Thames.
JNH – Talking about showing things on maps. It still doesn’t get us to the understanding that I think we really ought to be getting. We show it on the map, but what does it really mean. You showed me those maps of the Fenland area and that meant, fairly obviously, that there was close settlement. But it still doesn’t tell us how many people were involved there. We don’t really know what went into those fields do we. We don’t know what type of crop sequences were used and it seems to me that we should know those things because it ought to be possible to identify factors. If we used some of the earlier estate maps to provide a measure of field patterns, and combine this with what we know about contemporary agriculture and appropriate population, taxation, and market records, surely we would be able to identify – however roughly – the supportive capacity of a soil area. Clearly there are great dangers in relating this back to earlier periods but at least it’s a start. We should be able to identify an area, an appropriate area – appropriate in the sense that it would relate to something like we’ve got archaeological information about – and using that as a basis we ought to have some idea about how many people were involved in crop production, and so on.

RP – It’s difficult. One of the initial problems, even if, as almost in the fens, the evidence you’re getting from the air photos gives you a very near-complete map of what was going on. It’s very difficult to even guess where the boundary of each holding was – not the individual field – but, here’s a settlement; just how much of the land was that settlement working? Even on a modern map, an OS map rather than a legal map, it’s very difficult – impossible probably in most cases – to actually isolate property.

JNH – Yes, but it seems to me that that’s getting down to a level of detail that would be highly significant in a final analysis but in an interim, an early stage, would be unimportant. For example, if one used, say, for Scotland, the Old Statistical Account and combined it with early maps it should be possible, for discrete areas, to get some statistical yardsticks that might be capable of extrapolation. It should be possible, statistically, to get some measure of the number of people there and the sort of goods that were produced. We’re talking of before the age of mass transport.

RP – Yes... so you measure an area of what you decide is going to be farmland...?

JNH – A township, say.

RP – It’s one of the things I wondered about with this fen work because the potential seems to be there – it was possibly there in Wessex as well where you have definitely isolated blocks of field with settlements around or among. The next problem seems to be – and there’s an enormous range from maybe one acre to a hundred – of what a family needs to live on, or what a person needs to live on, a year.

JNH – I think you should be able to go beyond that because if you use the type of records we have discussed, surely some answers are possible, even if only in general terms that would be capable of refinement. The fact that you may get it wrong is probably better than not doing it at all.

RP – There was something along these lines in the book that Bob Bewley published which was essentially his thesis on Cumbria [Bewley 1994]. He mentioned in that something about using field capacity figures – ie how much the land can produce1 – which seemed quite an interesting line to follow. I did wonder whether that could be usefully developed. But there’s this cut off point between what I think of as photo interpretation, which takes you up to doing mapping, and then the archaeological interpretation afterwards – which doesn’t often happen.

JNH – This I think is a pity. I think that – as I said many years ago – unless you can achieve some understanding of what you have got you don’t know what is important and you don’t know what to ‘preserve’. Unless you understand to some extent. And I feel so sad that the efforts to understand, in the widest context, are not being pursued. And, here again, I don’t think it’s possible for one person, or even perhaps two or three people, with the best will in the world, to do

1In fact, field capacity is related to moisture content and thus to the workability of the soil (Bewley 1994, 66-8).
it. It has got to be a team operation – and multi-disciplinary in absolutely the widest sense. I can’t see any way that a ... county unit, or the Commission, or you or I, could do it. What it needs, I think, is perhaps some university to decide to pursue it.

RP – Ah, yes. Now we’re getting somewhere.

JNH – And, put in hand with a head of department who is really concerned in this matter and who is capable of bringing all these disparate elements of study together. And until I see that ...

RP – I think you might have to open up the University of Epsom.

JNH – But how exciting. This is something that is really getting to grips with ... and trying to understand the working of, say, an iron age or Roman landscape because it seems to me that this is one way to advance knowledge. You remember Allen’s study of iron age coinage, and the political/economic implications, largely still waiting to be applied to the landscapes recognised by air photography. On the other hand, just think of the impact of last year’s drought on an iron age agriculture – vast areas of the countryside decimated by famine. Would we see that in the archaeological record?

RP – Unlikely. Or whether people would start getting up and moving down to ...

JNH – Right, absolutely right. And here, surely, is the basis for understanding the history.

RP – The large project idea – it’s been in my mind ever since Cambridge days really. I’d always hoped in a way that, if I had got my PhD, and if I could then have got a College fellowship of some kind. The aim then was to try and start up ... what Eric Higgs had started for the ancient agriculture project. I don’t believe in most of what he did but the fact that he actually got together twenty-odd students all working on the same thing was ... it must have been an enormous boost for all of them. It really is what the aerial world would benefit from.

JNH – I don’t think it’s the aerial world that will benefit from it – I think archaeology. This is going on to the next stage.

RP – Yes. It’s where the aerial world could use itself and actually come back into archaeology – or come into archaeology. It does seem to be sitting out there all on its own.

JNH – It always seemed to me that, here we were, meeting and so on, but where were all the real people in archaeology. (Chuckles: “Have you got any good sites for me to excavate?”)

RP – Chris [Cox] sent me through something last night that she’d written as an outline for a talk for one of the IFA sessions which is taking as a theme the images that people see in photographs. She decided to use aerial photos. One of the bits in her outline was for her – as a fairly experienced aerial person – to say what archaeologists saw in aerial photographs. Now I don’t think she could ever say that because I think most archaeologists look at aerial photos, as you just said, “Ah, that’s a good site for me to excavate”. Or the other one, which I get quite a lot, “Oooh, look at that. Isn’t that a ring ditch there that you’ve missed out?”, or “what about this, what about that..?”. I’d be quite happy to keep air photos away from most working archaeologists because ... they don’t use them properly.

JNH – I remember saying at some meeting that photographs were the medium of discovery and maps were the medium of communication. And I see no reason to change that.

RP – But what you’re talking about now is the step beyond the mapped communication.

JNH – Yes, it’s really trying to understand, and in these sort of studies that I envisage there would be no heroes, no villains as such, there would be just a team of people producing a series of views. It would be just like a military operation in the sense that ... here is a terrain, what do we know about it, what is the geology, what are the communications, what are the industries, how do people live, how many people are there, what is the rainfall, will the land keep our tanks up..? And so on... It would be just like that except that we’d be looking back in time. The military do it – why can’t we do it? They use the same techniques, precisely the same techniques. I remember discussing this – the information that you get from air
photographs. We were talking about wartime operations and the importance of the amalgamation of information – that was the key. It wasn’t just the bit on the photograph, it was also the fact that somebody else was researching other aspects, and when this information was put together then certain conclusions became possible. And I’m sure this is what we need in archaeology. It’s not just the air photograph, its all the other information that you’d use and apply.

RP – Agreed, entirely. And it may happen in small patches in these developer-funded assessments. Or it would if there was actually any feedback. But for a major survey project it certainly hasn’t happened in this country. Whoever put down the original proposal is, quite possibly, not seeing broadly enough.

JNH – There’s not the vision. I believe that, unfortunately, academic archaeology is somewhat blinkered in the sense that it has established a syllabus of study and this is outside that range of study. After all, that’s not quite true because here we are [waving a copy of Landscape History], we’ve got the landscape studies group and they’re bringing it together.

RP – It’s having … I suppose, the diversity to ask questions which are not the normal questions. If you’ve got the, let’s say, the blinked archaeological approach. Before you can get outside that you’ve got to be able to ask questions that fit out of that. You need somebody with a familiarity of what is possible rather than, “Let’s do this again because we always do it.”

JNH – I have to come back to the central theme, and unless there is an incentive to do it it’s only the people like you and I – who are rather ‘queerly’ disposed, if you see what I mean – who have this sort of notion, these odd notions, about archaeology. It needs to be somebody who has the ability to being these elements together, and I just don’t see it because the odds are against it. There’s no ethos of this nature in the right places.

RP – Whenever I think about it I come back to the feeling that it’s partly our fault because we haven’t shown anybody what can be done. Our fault, being the small aerial world. We’ve tried. Cathy’s book [Stoertz forthcoming] ought to make an impact.

JNH – Oh, I hope so. I’m really looking forward to seeing this...

RP – It is good. I’ve read it twice, once for Cathy, once officially, and I just felt envious of somebody being able to work with that stuff. And she’s done it well. But, again, it’s having the impact with the outside world because it’s very largely – totally – aerial. There is an increasing number of what’s called ‘Landscape Archaeology’ courses – but I’m not quite sure what that means and I’m not quite sure if the teachers are either – which it might fit into.

JNH – We mustn’t be too pessimistic because, here we are (looking at Landscape History), ‘Cultural landscape change in north Wales’, ‘Salisbury Plain training area: management of an ancient landscape’, ‘Dispersed settlement in nucleated areas’ … so there’s one or two there that are striking a chord … it’s even got an air photograph in! These things don’t happen overnight, and they often don’t happen in the way that one would anticipate.

RP – These [the authors of the above] presumably are all people outside the aerial world. Which is – probably – good.

JNH – But I don’t think that any one person has got the capacity or the resource to do this because it’s so demanding of resources and time and research. I don’t suppose many groups have the resources – or the inclination – to undertake the range of research we have been talking about. I just can’t see a team of people getting together to bring about a truly multi-disciplinary study. Do you remember, in all the CBA conferences [Wilson 1975; Maxwell 1983] we always had somebody talking about the environment.

There followed a short reminisce about past difficulties of getting hold of air photos from a certain place...

RP – I can remember, as part of your collecting together everything, you’d written to St J and said, “could we have a copy of all of your photos?” and he’d written back and said, “No, but you can have 500 and I’ll chose them.” Which, I always think, accounts for
the numbers of very horizontal views in the collection – that may well have been them.

And a further such tale...

JNH – I think that all we need to say is that – personalities apart – there was a climate where people felt that if they’d taken the photograph and they’d seen a site that was good then it was their prerogative and their site to deal with. And you can see a certain degree of logic in it, you can understand it to some extent. It’s a very human reaction, and we mustn’t be too critical about it. The whole climate of opinion has changed. We’ve turned the corner now and whereas then it was a rather esoteric operation that only a few people – god-given people – could do, we now know that ordinary mortals can do it!

RP – Yes, to varying degrees. It still depends a lot on who’s talking and what they’re doing with the photos. This comes over quite clearly in some people’s work. You can see that they’ve never done any mapping, nor are going to – or they wouldn’t take photos like that.

JNH – I was asked to take some photographs of the Wey Navigation and I flew down it. But that’s the sort of photography which, in a sense, I abhor because it’s pictorial photography, just trying to get the best views of an upstanding feature.

RP – There was a time, for the conference in Southampton for Wheeler – maybe 1970 – when you, the Commission, were asked to take some photos of hill forts for an exhibition. From my point of view you just couldn’t get it right because I don’t think you’d done any pictorial photos before and there’s this problem of communication that I’ve always thought must be extremely difficult to get over with the pilot, you, and the photographer. But I think you went out two or three time to get these hill forts and kept coming back ... not quite getting crosser and crosser, but it was an art which you hadn’t tried before because that wasn’t your type of photo.

JNH – This is where I have to hand it to St Joseph. Over the years he developed a magnificent appreciation of the land. His views and some of the low-light photography are absolutely brilliant ... I don’t think I’ve seen quite such good material ever. But, there again, things were on his side because he could use that airfield at Cambridge in a way that we couldn’t ... and get up early in the morning or late at night ... we hadn’t that freedom. But his material really was splendid.

RP – It is, and one of the things I’ve appreciated flying around is the need to anticipate where the good position is going to be before you get there. I suppose it’s a mixture of eye for the landscape and knowledge of what aircraft can do. Chris has said, probably following on from Derrick [Riley], that the advantage of being able to fly is that you know whether it’s possible to get an aircraft from here to there, or into the angle and position that you need it.

JNH – I found that that wasn’t so difficult. What was difficult was to get the photographer to do what I wanted him to do ... it’s very difficult to get a photographer in your mind, to work together – particularly when you’re talking about half a second or so of window.

RP – It must have been quite frustrating at times, the way you had to fly ...

JNH – But neither John [Parkinson] nor Ron [Parsons] had long experience of doing this sort of work. I think the problem was ... If we’d had our own aeroplane and the freedom to fly when we wanted – as Roger [Featherstone] does now. It does mean there’s the flexibility to get up at, say, 3 o’clock in the morning without worrying about overtime, and who’s going to pay what, and all the rest of it.

A side-track on the joys of flying at those ‘extreme’ times.

JNH – I’ve always said that November and February are really the times when you ought to be airborne every day, because the sun angles are so marvellous. The trouble is in the evening I used to find that, nine times out of ten, there was inversion.

End of tape. But we continued and decided that very few people actually flew at such
times. Given the shortage of funding, flying was done when results were most probable and that, maybe, only Pickering had had the year-round views – the ‘bad’ times as well as the ‘good’.

Our conversation was still moving along reasonably well and another tape was begun. Some of the beginning was about internal Commission problems caused when the APU first produced maps, but then we got on to issues of mapping and drawing....

RP – I don’t remember doing any mapping for the Commission.

JNH – They wouldn’t have expected you to have done it.

RP – So this is why ... I spent six months at Salisbury after I graduated which was expressly for doing the mapping of what was called Hampshire 1.1 then – but the Bokerley area. So this was external to the APU.

JNH – There was a certain pattern of doing the work, it was drawn up, looked at, re-looked at, re-drawn sometimes, and then it went for scribing because it had to conform to a certain standard. Tony [Pope: RCHME illustrator] did my scribing for that first map [Hampton 1989, fig 4.6] and I looked at it, and I looked at what I’d drawn ... and ... he’d rounded off all the corners, and so on. So the subtlety of what I wanted to show was completely lost, glossed over. Not deliberately but just because it was in the standard procedure. That, I felt, wasn’t really adequate.

RP – I can tell that – looking at that published map and knowing you and the work that you’d do – I can look at that and say this is not something that you’ve drawn. It still carries on. I got the same feeling with the Roman forts book [Welfare and Swan 1995] which has got a certain amount of AP interpretation in it which has gone through the standard Commission drawing style and come out perhaps not as meaningful as it could be. Cathy’s book is going to suffer the same way I think. As did the big map in Danebury that Tony did. I’m not sure whether I would have been capable of drawing that but it’s a very mechanical map. I think the process of photo interpretation ought to finish with the photo interpreter producing the final drawing, rather than it going to the drawing factory.

JNH – I was pleased to see that in Bodmin Moor [Johnson and Rose 1994] they’d actually reproduced some of Anne’s [Carter] plots as opposed to redrawing. I thought that was a great step forward.

After which we agreed that we were drying up and really stopped.

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Hampton, J N. 1974. An experiment in multispectral air photography for archaeological research. Photogrammetric Record 8(43), 37-64.


Introduction

On 22 February 1995, President Clinton signed Executive Order 12951 directing the declassification of intelligence imagery acquired by the first generation of U. S. photo-reconnaissance satellites. Over 860,000 images collected between 1960 and 1972 have now been declassified and made available for purchase by the public.

In a previous issue of AARGnews, the ability of commercial western satellite imagery to detect archaeological features in the vicinity of Stonehenge was reported (Fowler, 1995). Not surprisingly, the low ground resolutions of these products (1030m) precluded the identification of the majority of the archaeological features in the area. However, a recently released Russian KVR-1000 image of the area, with a ground pixel size of 1.5m, showed that both standing monuments and - for the first time - crop and soil mark features could be directly detected on a satellite image (Fowler & Curtis 1995).

One of the main drawbacks of the use of the Russian imagery is the high cost (some £2500 for coverage of a 40 x 40 km area). In contrast, the products from the US photo-reconnaissance satellites are provided under the Freedom of Information Act and are available for the cost of reproduction.

This note aims to describe the nature and coverage of the recently declassified imagery and to assess its potential for use in archaeological studies.

Image products

The photographs that have been declassified relate to the systems code-named CORONA, ARGON and LANYARD (McDonald 1995; US Geological Survey 1996). The US intelligence community used the KH (Keyhole) designators detailed in Table 1 to describe the systems.

The first CORONA mission flew on 18 August 1960 and contained 3,000 feet of film and covered more than 1,650,000 square miles of Soviet territory. This was more overhead photographic coverage of the Soviet Union than the manned U-2 aircraft obtained in all of its 24 flights over Soviet territory. A further 93 successful CORONA missions were flown between October 1960 and May 1972. ARGON was a mapping system that flew seven successful missions between May 1962 and August 1964.

<table>
<thead>
<tr>
<th>Code-name</th>
<th>KH designator</th>
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<tr>
<td>CORONA</td>
<td>KH-1, KH-2, KH-3, KH-4, KH-4A, KH-4B</td>
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<tr>
<td>ARGON</td>
<td>KH-5</td>
</tr>
<tr>
<td>LANYARD</td>
<td>KH-6</td>
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</table>

Table 1. KH designators of photo-reconnaissance systems
LANYARD was a high resolution system but only flew one successful mission in July 1963. Altogether, a total of 2,109,221 feet of film, equivalent to 866,041 camera frames, were acquired by these systems over the 12 years of operation.

All of the declassified imagery were acquired by camera systems. At the end of a mission, a film capsule was de-orbited from space and recovered mid-air by a specially equipped aircraft (Peebles 1987).

The early KH-1 - 3 systems carried a single panoramic camera and the KH-5 a single frame camera. The later KH-4, -4A and 4B systems carried two panoramic cameras one looking forward and one looking rearwards. The KH-6 system carried a single panoramic camera that tilted between fore and aft in order to cover the same land area twice and thus acquire stereo coverage.

Details of satellite orbit altitude, film and image parameters for the various KH missions are given in Table 2.

As an example of the typical land area imaged by the KH-4B panoramic cameras, the nominal ground coverage of three consecutive image frames acquired in August 1968 over part of Southern England are shown in Figure 1. By way of contrast, the coverage of a frame from the lower resolution KH-5 mapping camera is shown in Figure 2.

### Coverage and product format

The declassified imagery contains photographs collected during the period 1960 - 1972 from throughout the world but with particular emphasis on Eastern Europe and Asia. More than 40% of the imagery contains significant cloud cover. The photographs are available as positive film, negative film and 1x paper prints from the USGS EROS Data Centre, Sioux Falls, SD 57198, USA for the cost of reproduction (approximately $8 - $18). Custom enlargements can also be ordered by purchasing a 1x print and marking the area to be enlarged.

A catalogue of the imagery is available on the World Wide Web through the US Geological Survey’s Global Land Information System (GLIS)* and can be searched free of charge. The index contains details of mission, pass, camera and frame number for each image frame together with the date of acquisition and an estimation of the four corner coordinates of the ground coverage. Browse

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* Available through the USGS EROS data centre home page at: http://edcwww.cr.usgs.gov

<table>
<thead>
<tr>
<th>System</th>
<th>Nominal altitude (km)</th>
<th>Camera type</th>
<th>Frame format (mm)</th>
<th>Frame ground coverage (km)</th>
<th>Best ground resolution (m)</th>
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<td>166-463</td>
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<td>55 x 750</td>
<td>12 x 210 to 42 x 580</td>
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<td>55 x 750</td>
<td>17 x 231</td>
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<tr>
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<td>172</td>
<td>Panoramic</td>
<td>115 x 635</td>
<td>12 x 64</td>
<td>1.8</td>
</tr>
</tbody>
</table>

**Table 2.** Camera, film and image parameters for declassified KH systems.
Figure 1. Area covered by three consecutive high resolution KH-4B image frames.

Figure 2. Area covered by a single low resolution KH-5 image frame.
images can be viewed to confirm frame coverage and to assess the degree of cloud cover.

To investigate the degree of coverage that is available, the GLIS catalogue was initially searched for imagery covering the environs of Stonehenge. Whilst the area was covered by some 38 low resolution KH-5 photographs acquired in 1963-4, only seven high resolution KH-4B images that had been acquired in 1968 were available. Inspection of the browse images showed that cloud totally obscured the ground for four cases and the remainder contained significant cloud cover (estimated to be over 75%).

By way of contrast, when the GLIS catalogue was searched for a random location in the Former GDR (51.34°N 12.33°E), some 26 KH-4A and 13 KH-4B high resolution images were identified with a large proportion being cloud free. In addition, some 18 KH-4 images, 43 low resolution KH-5 images and three early KH-2 images covered the location. Similarly, a search covering the position of the ancient city of Nineveh in Iraq (36.33°N 43.16°E) identified 21 KH-4A and 19 KH-4B high resolution images covering the location. A further 9 KH-4, 28 KH-5 and one KH-3 lower resolution images also covered the position.

From this very limited dataset, it would appear that whilst coverage of the UK is very poor (as would be expected from the Cold War origins of the imagery), for a given location in Eastern Europe or the Near East, there is a good chance that multiple high resolution images will be available for potential archaeological use.

Archaeological potential

The products from the KH-1 - 4 missions have slightly better ground resolutions than digital SPOT Panchromatic imagery (10m) and, by analogy, can be expected to detect only the largest of archaeological features. KH-5 imagery is of a considerably lower resolution than LANDSAT imagery (30m for Thematic Mapper, 80m for Multi-Spectral Scanner imagery) and hence unlikely to be of archaeological use. Imagery from the KH4A, -4B and -6 missions appears to be comparable with Russian KVR-1000 imagery (1.5 to 3m resolution) which has been shown to have the potential of supporting conventional aerial photography in the detection of both upstanding and crop and soil mark features.

Figure 3 shows a KH-4B image of the Roman legionary fortress at El-Lejjun, Jordan (31.21°N 35.8°E) downloaded from the US National Reconnaissance Office Web page* on the Internet. The image was acquired on 29 September 1971 and covers an area of some 1.25km by 1.6km with a pixel size equivalent to approximately 2.5m on the ground. On the image, the upstanding walls and U-shaped interval towers of the fortress that covers some 4.6 ha are readily apparent ([Kennedy & Riley, 1990, Figures 76-78] and in the interior, the ruins of buildings can be seen although not as well as on the conventional vertical photograph in Kennedy & Riley. Outside the walls, other features can be identified in the immediate vicinity of the fortress including:

(a) the ruins of a square building approximately 100m below the fortress;
(b) a circular feature together with several walls some 100m to the upper right of the fortress;

* URL: http://www.nro.odci.gov.corimag.htm. Other examples of CORONA imagery are available at this site but are of lesser archaeological interest as they are primarily of intelligence targets in the former USSR.
Figure 3. KH-4B image of Roman legionary fortress at El-Lejjun, Jordan.
(c) several roads/tracks in the vicinity of the fortress;
(d) two lines of early-twentieth-century Ottoman barracks extending over approximately 300m in the bottom left corner of the image (cf Kennedy & Riley, 1990, Figure 76).

The absence of an appropriate map of the area covered by the image makes further analysis impractical at this time. However, it is clear from this cursory look that this type of imagery has some archaeological potential. On cost grounds alone it should not be ignored and should be formally evaluated. If found to be capable of detecting other types of archaeological features (in particular crop and soil marks), the KH-4A and -4B products could prove a useful addition to the aerial archaeologist's conventional sources of air photographs. With particular emphasis on eastern Europe and Asia, the recently declassified imagery may be of help in supporting aerial archaeology in these parts of the world where either civilian flying has been prohibited until very recently or is still forbidden.

References
AERIAL ARCHAEOLOGY IN JAPAN: A PERSONALLY-EXPERIENCED OVERVIEW

Martin Gojda

Introduction
Having been awarded a three-week scholarship by the Japanese Society for the Promotion of Science I had the possibility to spend almost the whole month of April 1996 in the country of the rising Sun, in Nippon – Japan. Due to the fact I was extremely well secured financially by the Society I could afford, apart from my study programme in different university departments of archaeology, research institutes and museums, to travel extensively across the country and visit a number of most interesting places of Japanese archaeology and history. For me the most attractive time of the stay were almost two hours spent in a Cessna 172 cockpit, flying over the crucial region of Japanese early history in the landscape triangle between Osaka, Nara and Kyoto.

The history and current state of aerial archaeological studies
An important part of my study programme in Japan was to find out at least basic facts upon what aerial archaeology in Japan has been about. I must confess I had almost no idea about this before I arrived in the country. The only positive thing I had in my hands was a written promise from a Japanese colleague to organise a flight for me if weather conditions allow it. In a sense a promise like that suggested there are no restrictions in Japan for foreigners to rent an aircraft and take photographs from the air.

During my library studies and consultations with colleagues from the Dept. of Archaeology of the Okayama University (where I was based) and from the Nara National Cultural Properties Research Institute I managed to collect general information about past and present Japanese aerial reconnaissance.

The first aerial photographs taken by Japanese archaeologists are oblique documentation photographs of a burial mound situated at Oku, Pyong’an-Namdo, Korea. They were taken in 1925 during the excavations of that site by Tokyo Imperial University. One year later a shell midden dated to the Jomon period at Ubayama, Chiba Prefecture, Japan was photographed by a pilot of a military school aircraft. A set of vertical images resulted from this action; one of them clearly shows the bounds of the midden. Reports on these two campaigns have been published as a part of Vol.II/2 of the journal Kókogaku (subtitled A Bi-Monthly Review of Archaeology) dedicated to aerial archaeology. In addition to two articles by a Japanese archaeologist (Morimoto 1931a; 1931b), a comprehensive paper by O.G.S. Crawford (1931) on aerial photography was published in that volume together with a number of photographs from Britain documenting the potential of air survey for archaeology.

After the World War II archaeology in Japan underwent extensive changes. Hand in hand with the fall of the traditional state ideology based on the belief in the emperor's divine origin, historians and archaeologists got the chance to analyse facts, and at the same time, to interpret the past in a free manner. Under the influence of the social and political shift in the country, archaeology soon became a developed discipline (Gojda 1996). Since the 1970's almost all archaeological funding has been spent on rescue activities. In 1990 there were some 5,700 professional archaeologists (just 300 are based in universities) who managed to excavate on 26,000 (!) sites (approximately 1/3 of them can be termed proper larger-scale actions, the others were just test digs or limited activities). $800 millions (US) were spent by the state and by developers to cover the excavation expenditures and post-excavation operations (CAO News 1992).

The post-war archaeology in Japan is then firmly orientated toward the field rather than to theoretical studies. Most specialists are
Fig.1: Ishibutai barrow (Asuka region, early 7th cent. AD) surrounded by terrace rice fields. Photographs 1, 4-6 by the author.
Fig.2: Sakitama Inariyama key-hole shaped kofun (Saitama prefecture, near Tokyo). A rare example of a buried feature seen from the air. The central part of the barrow survived while the front trapezoidal one disappeared and is traceable as a dark line crossing the white road. Copyright: Nara National Cultural Properties Research Institute.

Fig.3: Chojya-guruwa Namekata (Saitama prefecture, near Tokyo). Another example of a marked buried monument, a mediaeval moated site in this case. Copyright: Nara National Cultural Properties Research Institute.
focused on the study of a chronological period. Principles of landscape studies (diachronical evolutions of regions) and theoretical studies in general are rare. They are based in a traditional positivism, most often closed to the current streams of western archaeological orientation. On the other hand it is the non-destructive prospection methods (together with conservation) which have the most developed techniques used in Japanese archaeology. Best developed are various methods of geophysical survey (especially the ground-radar technique: Goodman & Nishimura 1993). Aerial reconnaissance, unfortunately, plays relatively small role among prospection methods. In general this is due to the character of the cultural landscape. All the lowlands are either built-up and covered with urban units or they have been changed into small rice paddy fields whose form (small pieces of bounded land blocks, see Fig. 1) creates a mosaic which is just occasionally suitable for distinguishing sites/features. Moreover, most of these fields are situated on silty plains with a high level of the sub-surface water. Figs. 2 and 3 show that the potential of that type of cultivated landscape is not necessarily so low.

In contrast to the slightly used aerial reconnaissance technique it must be stressed that aerial documentation photography of sites, monuments and historical landscapes is a wide-spread means of bringing visual information both for archaeologists and for the wide public. All important museum exhibitions, academic and popular books on archaeology are full of high-quality aerial photographs. One of the best examples is a three-volume monograph on the most important mortuary monuments of Japan, the so-called *kofun* (mounded tombs, c.300-700 AD; in Fig. 4 you can see the most characteristic form of these burial monuments, the key-hole shaped *kofun*). The book’s illustrations include many excellent black and white aerial photographs (Suenaga 1974). Suenaga started aerial research on tombs in 1954 and continued till the end of the 1960s. During his campaigns, Suenaga

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Fig.4: An example of a large key-hole shaped burial mound (ko-fun), one of the biggest in Japan (SE Osaka, 5th cent. AD).
managed not only to document the burial mounds but contributed to some problems concerning the rules of placing them into the landscape. For the first time he discovered the existence of the Shuteita (surrounding zones). He also detected that these huge structures were built in zones which in those times were unproductive. At the end of the book Suenaga proclaimed his opinion that air research on tombs opened up a new dimension in Japanese archaeology and would become one of the fundamental methods of investigation in the future.

The 5th April 1996 flight over the historical region of Kansai (Map 1)

For a western foreigner the small aircraft rental cost is very expensive (three to four times more expensive than in Britain). Fortunately I could afford the luxury to fly and share the cost with two of my Japanese colleagues. We started in the morning of a sunny but hazy day. The visibility ranged between 5 to 10 kilometres and the air brightness still allowed relatively good air photographs to be taken. The itinerary of the flight was attractive. We started from one of Osaka’s airports and flew to the south to Sakai where the biggest Japanese kofun (the Nintoku's one) is situated. Then we took the ESE direction and on the way to Asuka region (which is a part of the Yamato Plain) we passed over a number of other key-hole shaped burial mounds. Asuka is the region where the earliest capital of Japan, Fujiwara-kyo, existed between 694-710. There is also the Ishibutai rectangular barrow with an entrance corridor constructed of huge megalithic blocks (Fig. 1). We then turned the aircraft straight to the north and soon reached Nara, the most important place of the first part of the Ancient (early medieval) period when the Japanese state was established definitely. Between 710 and 784 the residential city of Japanese emperors with an extensive palace site became the centre of Buddhist religion. A number of temples was established at that time including the most powerful, Todaiji, with the biggest wooden building in the world (Fig. 5). After Nara, we followed the north course and admired the characteristic features of Japanese cultural landscape. Finally we approached Kyoto, the capital of Japan from 784 until 1862, and the historical centre of Japanese culture and education. Its sites and monuments (like Nijo Castle, the residence of the Tokugawa shoguns, Fig. 6), especially seen from the air, resemble islands or oases in the sea/desert of the endless streets of the densely built-up city. The precinct of the Kyoto imperial palace is also magnificent as well as all the Buddhist temples and Shinto shrine (the so-called jinja or jingu) placed on the left bank of the Kamo river east of the city centre.

Conclusion

During my stay in Japan I was happy enough to have the opportunity to see the landscape, sites and monuments both from the ground, and from the air. Obviously, they are all quite different to what we know from our European context but as a whole the country has its own irreplaceable spirit and characteristic features which are so well imprinted in Japanese heritage. For any archaeologist a visit to the country is not only a great experience but, in a sense, a challenge for future study of settlement, religious and cultural history of a 'solitary' island nation.
References


Fig.5: Todaiji (Nara), one of the most important Japanese Buddhist temples. Its structure of the current Great Hall dated to the beginning 18th century is the biggest wooden building in the world.

Fig.6: Nijo Castle, the Kyoto moated residence of the last sho-gun dynasty, the Tokugawa family, constructed around 1600.
There is a certain fascination in reading how our predecessors, often on horseback but without the more elevated viewpoint and greater mobility of an aircraft, tried to make sense of anomalous features in soils, crops and pasture. Sometimes they got it absolutely right; more often they were pretty much at sea as they sifted through competing theories. In AARGnews 12, Anthony Crawshaw drew attention to the acute observations of German mineral prospectors as described in Agricola’s De Re Metallica (1536), but theirs is a somewhat special case. They were specialists, starting from a detailed knowledge of underground structures (veins of mineral ore) and deliberately looking for linear anomalies that might provide a clue to locating them. This is the reverse of the common situation in which a thoughtful observer catches sight of something odd and wonders what mechanism could have caused it.

Crawshaw also referred to Camden’s early observation and understanding of the settlement beside the Roman fort at Richborough (Kent). Camden (or his informant) is one of those who did ‘get it right’; his comments first appeared, in Latin, in the 1594 edition of Britannia, but are more conveniently quoted from Philemon Holland’s English translation of 1610:

But now age has eras’d the very tracks of it; and to teach us that Cities dye as well as men, it is at this day a corn-field, wherein when the corn is grown up, one may observe the draught of streets crossing one another, (for where they have gone the corn is thinner) and such crossings they commonly call S. Augustin’s cross.

A similar identification of Roman streets from negative crop marks was made at Silchester (Hants) in the 18th century by John Stair: ‘the method he took to discover where the Streets formerly ran, was by observing just before Harvest, for several years, the places where the Corn was stunted’ (letter of John Collett, 5 Jan 1744/5, quoted by Boon 1974, 23). These observations were confirmed by trial excavation and then planned by a professional surveyor (plan reproduced in Boon 1974, pl. 1). This must surely be the first accurate plan of an archaeological site to be published that is derived from the study of crop marks.

Another well-known 18th-century observation of negative crop marks was made by William Stukeley, who saw traces of the ’villa’ later excavated by R. C. Neville at Great Chesterford (Essex) in 1848, which Stukeley understood as ‘the proper vestigia of a Temple, as easily discernible in the corn as upon paper. ... The people say, let the year come as it will, this place is ever visible, and that it has been so ever since the memory of man, and fancy the fairies’ dancing there causes the appearance’ (letter of 12 July 1719, quoted by Piggott 1950, 52). Elsewhere (1724, 75) Stukeley noted that ‘the poverty of the corn growing where the walls stood, defines it to such a nicety, that I was able to measur it with exactness enough.’ Nevertheless, Stukeley’s plan shows what he thought he saw (a classical temple surrounded by a colonnade), whereas what Neville eventually uncovered was a dwelling-house; he specifically looked for Stukeley’s stylobate and column bases, but found neither (Way 1849). It may be
thought characteristic that Stukeley understood the mechanism of negative crop marks, but could not restrain his imagination when attempting exact measurement.

The purpose of the present note, however, is to draw attention to the observations and comments of Robert Plot in his *Natural History of Staffordshire* (1686). Plot is described on the title page as 'LLD. Keeper of the Ashmolean Museum and Professor of Chymistry in the University of Oxford', so he was evidently a man of parts! His discussion of fairy rings and related phenomena comes in his first chapter, 'Of the Heavens and Air', for reasons that will become apparent. We begin at paragraph 17.

17. And here perchance by the way it may be no great digression, to enquire into the nature and efficient cause of those Rings we find in the grass, which they commonly call Fairy circles: Whether they are caused by Lightening? or indeed are the Rendezvouzes of Witches, or the dancing places of those little pygmy Spirits they call Elves or Fairys? And the rather, because 1. a Question perhaps by reason of the difficulty) scarce yet attempted, and 2. because I met with the largest of their kind (that perchance was ever heard of) in this County: one of them shewed me in the grounds between Handsworth Church and the Heath being near forty yards in Diameter; and I was told of another by that ingenious Gent... the Worshipful Sir Henry Gough Knight, that there was one in his grounds near Pury-Hall but few years since (now indeed plowed up) of a much larger size, he beleived near fifty, whereas there are some of them not above two yards Diameter; which perhaps may be near the two extremes of their magnitude.

18. Nor is their difference only in the extent of their Diameters, they varying also in divers other respects, though not proportionally so much: for I have always observed that the Rims of these Circles, from the least to the bigest, are seldom narrower than a foot, or much broader then a yard; some as bare as a path way in many parts of them, others of a russet singed colour (both of these having a greener grass in the middle) and a third sort of a dark fresh green, the grass within being of a browner colour; the first kind seldom less than five or six yards Diameter, and the other two of various Magnitudes: And all these again, as well imperfect, as perfect; some of them obtaining three parts of a Circle, others being Semicircular; some of them Quadrants, and others not above Sextants of their respective Circles.

19. Now that Wizards and Witches have sometimes their field Conventicles, and that they dance in such rings, we have ample Testimony [which Dr Plot goes on to set out in some detail. In para 24 he also introduces 'little Pygmy Spirits that infest the Mines of Helvetia and Hungary', which seem to be a subspecies of elves and fairies.

...
to those of the first kind, that are bare at many places like a path-way: for to both the others more natural causes may be probably assigned: As first according to the opinion of the ingenious Mr. Lister, that at least some of them may be occasioned by the working of Moldwarps [i.e. moles], which however for the most part irregular they may be, yet may have a time when perhaps by instinct of nature they may work in Circles: as 'tis certain fallow Deer do in the time of Rutting, treading the same Ring for many days together: indeed the strange fertility of these green Circles, even upon the most barren Heaths, beyond any place else about them, doth argue some extraordinary dung or compost, which he supposes to be the Excrements of Moles, or Moldwarps: others have fetcht their Origin from the dung and urin of Cattle fed in winter time at the same pout of hay, for their heads meeting at the center, and their bodies representing as it were so many radii, has made some imagin that such Circles are described by their dung and urin falling always from them in due distance, and fertilizing the ground in a more than ordinary manner by the largeness of the quantity. Others again have thought them described by the water and some of the Hay it self, falling plentifully in wet weather from the Eaves of round hay-stacks, that have been situate within them, which rotting into dung thus fertilizes the Earth in a circular manner; and indeed it is possible that some of them may be made either of those ways.

28. But for the Circles ... of 30, 40, and 50 yards Diameter (too too large for the situation of any Hay-rick, or to be described by Cattle feeding at a hay-pout) and some them running through hedge and ditch ..., we must seek for other causes: In order whereunto (having good opportunity in New-Parks near the City of Oxford, where there is always plenty of them I thought fit to examin the nature of the Soile under the Rims of them, especially how it differed from the adjoyning earth, and found by digging up several, that the ground under all of them, was much looser and dryer than ordinary, and the parts interspersed with a white hoar or vinew much like that in mouldy bread, of a musty rancid smell, but to tast insipid and this scarce anywhere above six inches deep, the earth again below being of its due consistence and genuin smell, agreeable to the rest of the soils thereabout.

29. Whence it being equally plain that I was no longer to enquire for the origin at least of these larger Circles, either from any thing under or upon the ground; it remained that I should look for some higher principle, and indeed ... I could think of none nearer than the middle region; viz. that they must needs be the effects of Lightening ...

30. And not only in a single, but sometimes in a double and treble Circle one within another, as was lately shewn me by my Worthy and Ingenious friend John Priaulx M.A. of University Colledge in the field between St. Giles's Church near Oxon and the garden called Jericho: They are rarely also seen of a quadrangular forme, encompassed with another of the Circular kind whereof there were shewn me no less than two examples by my Ingenious and observing friends John Naylor and Hugh Todd M.M.A.A. and
Fellows of University College in the same St. Giles's fields ... All these Rings and Squares being greater or less in proportion to the distance of the Cloud from the Earth, and tenaciousness of the matter, and appearing at first of a russet colour, the grass just then being singed with the Lightning; but the year following of a dark luxuriant green, the earth underneath having been highly improved with a fat sulphureous matter (received from the Lightning) ever since it was first striken, though not exercising its fertilizing quality until some time after.

... 31. ... the Cattle which feed in these pastures, unless driven by extreme drought, will never touch this rank sort of grass, it not having the genuin taste of the rest.

33. ... we may relye on the faithful testimony of one Mr. Walker a man eminent not only for his skill in Geometry but in all other accomplishments, who by chance one day walking in a Meddow amongst Mowers (with whom he had been but a little before) after such a storne of Lightening presently espyed one of these Rings about five yards diameter, the Rim whereof was about a foot broad, newly burnt bare as the colour and brittleness of the grass roots did plainly testify, which the year following came more fresh and verdant in the place burnt, than in the middle, and at mowing time was much taller and ranker grass than any in the Meddow.

34. [In dealing with objections to the lightning theory, Dr Plot returns to the rings that grow from year to year] ... which yet we cannot but acknowledge some of them certainly doe; having not only took notice of the thing my self, but had it from others of unquestionable fidelity ... . That at Handsworth having been observed for divers years by the Reverend Mr. Ange Rector of the place, who seriously told me that when he first knew it, it exceeded not 4. yards diameter at most, whereas when I measured it Anno 1680. it was increased almost to 40. haveing run through the hedg into another field: As that other at Pury-Hall, being in a field near the River (as I was informed by the aforementioned Sr. Henry Gough) so increased from a smaller to a larger extent, till at length it came to be of near 50. yards diameter, and to run into the water. ...

35. [Ellipses and imperfect circles are explained by the fact that lightning seldom strikes truly vertically.]

36. [Growing circles are caused by a creeping disease of the nature of herpes or shingles, introduced by the lightning strike.]

37. ... And thus much for these Circles, and enough too may the Reader say ...; but herein I do not doubt but he will easily give me pardon ... it haveing scarce ever been treated on before, by any other Author that I could either meet with, or hear of.
So, what (after more than 300 years) do we make of the ingenious and observing Dr Plot? He may be given credit for distinguishing between rings of different kinds and therefore looking for different causes; for his reluctance to accept the relevance of witches and elves in the 17th century, whatever might have been their activity in the past; for field investigation of one kind of ring, and for his eventual recognition of the effects of fungal infection. Rings that increase in size from year to year and are made of grass with a smelly white coating on the roots are undoubtedly 'fairy rings' in the traditional sense, produced by the spread of such infection outwards from an original central focus.

Double and triple rings appear to us to be likely to be caused by underlying concentric ring-ditches, and the rare variant with a square inside a circle, even if not fully understood archaeologically, is still to be seen beside the Thames in terms of crop marks south of Aston (Oxon) (Fig 1). Some at least of the single rings of the green variety can be supposed to be similar. Nowhere is there any suggestion, however, that Plot's examples were seen in any crop other than hay, so most must have been revealed only briefly and occasionally by parching of pasture - something that still occurs in riverside meadows along the Thames in time of drought (Fig 2).

The detailed exposition (with diagrams) of the effects of lightning, which I have omitted from the quotation, had to suppose a cone of force projected from the thunder cloud to intersect the ground surface in a (usually imperfect) circle. This has little to do with the operation of lightning as actually observed, but it anticipates in its broad approach the plasma vortex theory.
developed by Dr Terence Meaden to account for modern crop-circles. Meaden's starting point was a disc of flattened crop, though he later elaborated his model to encompass concentric rings, whereas Plot was dealing with (possibly scorched) rings in grass; but both needed to find an atmospheric force that would produce an otherwise unexplained circular phenomenon at the surface. The whole tone of Plot's discourse, trying at first to be open-minded but looking for a decent scientific explanation, brings to mind that of the more responsible students of crop-circles in the years before it became clear that the most striking examples of these were actually the work of modern landscape artists.

Apart from documenting a minor facet of the history of scientific thought, Plot's excursus serves to remind us what has been lost as a result of Oxford's expansion from the 18th century.

Fig 2. Port Meadow, Oxford, 7 September 1976. Photo: Cambridge University Collection of Air Photographs, CBO 47.
onwards. Under the Radcliffe Infirmary and elsewhere in St Giles's Fields was once much that would have been of interest to archaeologists today. Plot was not cited by Benson & Miles (1974, 19) in their review of early crop-mark literature for the upper Thames valley, and his observations have scarce ever been treated on before by any other author that I could either meet with or hear of. I am the more indebted to Dr Gay Wilson for having drawn my attention to them.

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The small cropmark debate?

Robert H Bewley

Our Editor is right to raise the question of terminology. The reason I am concerned about terminology is the need for clarity of meaning, which is abundantly clear from the Editor's piece (AARGnews 12: March 1996) entitled 'THE GREAT CROP MARK CRISIS'.

There is no crisis: we have been living with the terms crop mark, cropmark, soil mark, and crop-mark sites for over 70 years. We are now having to think about using another term 'crop marked'. Surely we all agree that when referring to cropmarks we are talking about 'features revealed by cropmarks'? I have not been consistent in my use of terms in the past but it is time we all were; we should create new words, 'cropmark' 'parchmark' and 'soilmark' and submit a definition to the Oxford English Dictionary. (Perhaps - 'cropmarks are visible as a result of the differences in the rate of growth of crops caused by buried subsoil features. Most commonly these are ditches, walls or pits as well as geological formations and are most easily recorded by air photography.')

I also think we should not introduce the term 'crop marked', mainly because it might be a retrograde step and air photo interpreters might use it instead of making interpretative decisions (eg referring to 'cropmarked features' instead of saying they are 'ditches').

The Editor was arguing for the recognition of crop mark as two words as a noun and hyphenated when used as an adjective, as in 'crop-mark ditches'. This is the proper use of English but it is very difficult to achieve consistency even within the English-speaking world. If he cannot use it consistently how can he expect all the other archaeologists who use the terms to use it properly? This is particularly true when more and more archaeologists who use aerial photographs do not have English as their first language. The title of his piece should read 'The Great Crop-Mark Crisis' (if he was following his rules about the hyphenated crop-mark usage!). As you can see from my title I would prefer a small and considered and debate and the reason I am in favour of new words is that it will signify more clearly that the term `cropmark' has a defined and specific usage. Anyone using it will then know it is shorthand for geological or archaeological features revealed by cropmarks.

So, in defence of cropmark, its use will show that we mean something more than a crop mark (which is also a printer's term). When the article in Antiquity in 1989 was published, with the title 'An archaeologist's guide to the classification of cropmarks and soilmarks', no-one commented in writing or verbally that `you can't classify cropmarks or soilmarks but you can classify archaeological sites as revealed by the phenomenon of cropmarks'. The reason for having the debate is so that we all know what we mean by cropmark and that we can use it as one word rather than having to use a sentence, we can be consistent, and that we are not spending all our days editing records, reports and articles double checking for the adjectival use with a hyphen!

This is the speedily-produced volume resulting from the Kleinmachnow Symposium on Aerial Archaeology held in September 1994. One of the aims of the meeting was to allow the eastern ‘beginners’ to learn from 70 years of aerial work by the western ‘experts’. Thus the ‘expert’ contributions occupy a large one-third of the volume (and are in English) and broadly follow the theme, this is how it’s done, with – as expected – a wide range of views, little agreement between authors, and an amazing demonstration of MORPH’s ability to date sites. The remaining two-thirds present examples of work undertaken, and in progress, in Europe, with diversions to China and the Sudan. Most of those papers are in German and show a range of practical and technological approaches for dealing with the aerial evidence and integrating results of reconnaissance with archaeological field projects.

To me the Symposium worked in reverse and I think, that in terms of archaeological practice, we have a tremendous amount to learn from those now active in central Europe. In the west we do have a 70-year history of ‘Aerial Archaeology’ (summarised in David Wilson’s paper) but may this have had the effect of letting us become complacent? Are there likely to be any admissions of mistakes or misdirections now that archaeology has become a ‘profession’ and has created an extended management structure within its official organisations? In central Europe there seems to be a refreshing sense of enquiry. Archaeologists are trying to find out about their data and are catholic in the methods they use to do so (see, for example the paper by Martin Gojda in this issue) while in Britain we have been conned into believing that preservation is better than investigation and seem content to identify progress in terms of numbers.

These Proceedings have been extravagantly produced and make a weighty (and costly) volume. Reproduction of plates and line drawings varies from excellent to ok and, bearing in mind that there was no author-proofing stage, there seem to be remarkably few obvious errors. Editing must have been a huge task and included the writing of English and German summaries for all papers and the production team are to be congratulated on its presentation and rapid publication. The Proceedings make a useful summary of the states of the subject in the mid 1990s and, as such, may make a useful addition to libraries. Cost may put it beyond reach of many interested individuals or those whose interest – as happens so often in conference publications – is restricted to one or two papers. These people may perhaps be advised that each author was given 50 offprints!

I know of no UK distributor for this book. Orders are taken by: Brandenburgisches Landesmuseum für Ur- und Frühgeschichte, Schloß Babelsberg, D-14482 Potsdam, Germany.


This excellently written summary of St Joseph’s life and work should be of interest to all AARG members and to anyone studying the development of archaeology in Britain from 1945. In parts it reads like the adventure it must have been and the reader is drawn in to the manoeuvrings, manipulations and determination – as well as the sense of discovery – that lifted St J and the collection at Cambridge to the pinnacle they still retain.

From the almost abstract cover inwards, this book is something different to the usual run of *my patch from the air*. I may be biased by my southocentric view, but it is more than the photographs that make *Grampian’s Past* stand out from others in the heap – although even these are differently balanced to the usual. Of the 112 listed photographs, plus five introductory ones, 27 are snow scenes taken on dates between October and April (almost May). There are also many autumn upland photos where sites are highlighted by flowering heather, etc.

*Grampian’s Past* is based on photographs taken between 1977 and August 1995 for which finance came from SDD and RCAHMS. The photographers were archaeologists at Aberdeen University or Grampian Regional Council, the publishers of the book. As expected, most of the book comprises photographs with short captions but the introduction of about 1000 words includes one of the neatest descriptions of crop marks that I’ve read. This begins by listing a few of the features that were used in the past in a way that is easily understood by the reader (and, dare I say it, by the non-*aerial archaeologist* as well!!). Words such as ‘posts’, ‘stockades’, ‘homes’, ‘pits ... to bury the dead’ and ‘timber’ all create an instant image which ‘ditch’ and ‘negative feature’ fail to do. The order of *Grampian’s Past* is correctly archaeological, starting with the present and skimming down to the neolithic. This is useful for two reasons: readers are unlikely to become bored and frustrated by the apparently meagre neolithic sites and are able to tune their eye from the beginning on photographs of easily deciphered modern scenes. Each photograph is accompanied by short, no waffle, descriptions which encourage the viewer to search the print for features mentioned. Print quality is sufficiently good to allow use of low magnification on these – something I found useful a few times. Each page includes a small map on which sites are located. These are consistently in the SE corner which enables the reader to flick through to search for locations or areas of interest while a full-page map in the introduction adds (not quite enough) place names to the region.

Normally I dislike colour photographs but in *Grampian’s Past* and on the range of landscapes and vegetation they seem useful and do not seem to mask the clarity of detail. Some of the locations manage to provide a near-monochrome appearance, others capture the beautiful northern light, while some on moorland have provided an almost abstract picture (was Cezanne the bloke?). Choice of cover photo was a stroke of genius – is it art? is it archaeology? is it a satellite image? – but whatever it is it draws attention to the book.

A lot of thought seems to have gone into the words and pictures of this book in order to make it accessible to all levels of readership. Special praise should be heaped on Andrew Shaw for design and layout and to Grampian Regional Council (now Aberdeenshire Council) for their commitment to publishing the book. The review copy included a press cutting showing it to be in Waterstone’s ‘Top Ten’ in March 1996. It deserved to be.

Copies are obtainable from Archaeology Service, Economic Development and Planning Dept, Woodhill House, Westburn Road, Aberdeen, AB9 2LU. The price above includes p&p.


Considerable effort has gone into rewriting and updating much of this book and the short section on aerial (and higher) recording is vastly better than in the first edition (*cf* me being rude in *AARGnews 3*). Most of the illustrations in the volume are reproduced clearly, with use of a single colour to aid clarity. The book is aimed at an American readership (presumably, over here, we know it all?) and is full of those aweful spelings of theirs.

This latest volume in the Cambridge Air Surveys series follows the usual format. Chapters are arranged thematically with each having an introduction followed by a number of illustrated case studies. References are similarly arranged which, although resulting in some duplication, enables the reader to pinpoint rapidly the relevant works. The distribution map shows that Darvill has attempted to cover all parts of Britain even though there is a definite Wessex bias. But, to be fair, one of the book’s aims was to show the way certain areas continued to attract attention in the past. Most of the photographs have printed clearly and – much to my delight – most of the verticals are printed with shadows falling towards the viewer so that the image appears topographically correct.

To write a prehistory focused around a hundred or so air photos is quite a feat and there is much to like about this book. For a start, it is welcome to have an archaeology ‘from the air’ book written by someone who is not an aerial specialist. Thus, instead of pages about crop and soil marks we have observations about the need to examine ‘several’ photographs to ‘develop a comprehensive view’, and that mapping allows appreciation of societies’ use of space. So much for ideals. Unfortunately, restrictions on the size of the book restricted illustrations to one per site and, until the final chapter, there are no line drawings. The introductory chapter also includes a few logically argued and easily understood paragraphs which discuss classification and how features become what we recognise today.

By following themes (such as ‘Farmsteads and fields’ and ‘Villages and towns’), which largely equate to types of site, Darvill places some sites in unexpected groups. So, while it is pleasing to acknowledge the existence of villages and towns in prehistoric Britain, it was somewhat surprising to find Durrington Walls among them. Such curiosities aside (and Darvill clearly states his reasons for them), the text of the book flows easily from site to site and from theme to theme with adequate factual consideration and through recurring discussion of the book’s subtitled topics. At some sites I had problems linking the text to the photographs (and had to use my own OS maps in a couple of instances). Use of oblique interpretative drawings would have helped enormously at some of the more complex sites and – possibly – cut down on text length. More use too could have been made of captions, especially with the CUP broad-margin design which can leave 25% of a page blank [for notes maybe?].

Use of aerial photographs tends to result in a prehistory that is very site-o-centric. This is emphasised by the obvious need to draw on excavated data to be sure that the recorded features are, indeed, prehistoric. By making a rapid trawl of the references it appears that, of the 119 sites (plus five areas) discussed, only 30 are known solely from aerial photographs. Of the remainder, 63 (or 64) have been excavated and 25 include input from field survey. By themselves, these figures make a reasonable balance and allow the reader to have confidence in the basis of Darvill’s arguments. But the restriction to ‘sites’ produces a very biased prehistory which omits, maybe, 90% of the evidence resulting from aerial survey. The only way to make use of that 90% is, as Darvill noted in his introduction, through mapping it – and absence of these is, to me, the book’s greatest omission. No period of the past ought to be studied by its ‘sites’ alone and in the prehistory of Britain we have numerous examples, some mentioned in this book, where things join together, where settlements and field systems interlink, where features on one side of a boundary differ significantly from those on the other. Examples of these have been published, and inclusion of some of them would have considerably enhanced the academic breadth of this book as well as providing illustrations (ok, I know that many people think maps are boring) of points made.

But these are the restrictions, maybe self-imposed, on the book’s contents. As it stands it provides a well-illustrated (*not* thankfully – all the same old pictures) and broad view of
many types of prehistoric feature known in Britain. Some of these are known only from the air, others appear more to illustrate a text describing an excavation (I sometimes imagined myself sitting in a lecture...). It annoyed me that there was an unexpectedly high number of instances of what I can only think of as sloppy English. Substitution of ‘photography’ when we mean ‘photographs’ is something we all do, but here Darvill breaks all records with examples such as ‘..[this is] a book about aerial photography...’ (xix), and numerous occurrences of sites ‘..discovered by aerial photography.’ (37, 42, 83,...). Despite this, and the growling it caused, the book is otherwise skilfully woven together to produce a very readable text which includes some innovative insights into the actions and motives of Britain’s prehistoric communities.


Not directly related to aerial photography, but an ingenious interpretation of excavated features that ought to make us think about our own interpretations of recorded features. It also goes to show that being a modern farmer (Pryor’s second profession) helps think about prehistoric farming.


Unseen. The author will be at AARG (maybe with a copy) and examples of the illustrations can be seen elsewhere in this issue.
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