Recent Aerial Reconnaissance in North Oxfordshire

By ROGER FEATHERSTONE and BOB BEWLEY

INTRODUCTION

Over the past ten years there have been more than the usual number of hot, dry summers. This has a special significance for the discovery of archaeological sites from the air because dry weather conditions seriously affect the growth of crops. Local variation of the soil's ability to provide moisture and nutrients can result in differences to both the height of the crop and the length of its overall growth cycle.¹ The Royal Commission on the Historical Monuments of England (RCHME) has carried out annual programmes of national aerial reconnaissance from 1967, until merger with English Heritage in 1999, and has frequently operated in Oxfordshire, especially over the gravel soils along the Thames Valley. This article highlights recent work in North Oxfordshire and the Cherwell valley.

As a result of the hot and dry weather in June and July 1994 crops over a wide area of southern England were beginning to show signs of stress and nowhere more than on the limestone soils of Oxfordshire. Here, geological variations and archaeological sites were becoming clearly visible over a very wide area. On a memorable flight made on 12 July 1994 the author was accompanied by the RCHME's former Chief Executive, Tom Hassall, who was of the opinion that many of the sites visible in the area between the Kidlington and Upper Heyford airfields had not been seen before (Fig. 1). A subsequent check against the existing photography, the National Monuments Record (NMR) in Swindon and the Oxfordshire Sites and Monuments Record (SMR) revealed that 80% of the sites recorded on that flight were new. Reconnaissance in the area continued for a short while until no more cropmarks could be found. Surprisingly, the summer of 1995 was even drier and again provided a good opportunity to record sites in this area.

It was clear that a great number of sites had been recorded during 1994 and 1995 but there was no simple way of checking how many of these were new to the record. This was because there has not yet been a detailed survey of all the archaeological evidence recorded on aerial photography for this area, in contrast, for example, to the Thames Valley just to the south.² Here, some 1200 sq. km. have been surveyed at 1:10,000 as part of the RCHME's National Mapping Programme³ and new sites subsequently recorded in this area are easily confirmed. Fortunately the Oxford University Department for Continuing Education requires its diploma course students to work on a placement, and Simon Thorpe and Jonathan Chandler as part of their placements were able to check the existing photography for this survey area of 800 sq. km. in North Oxfordshire (Fig. 1).

The checking focused only on sites appearing as cropmarks, soilmarks or parchmarks (hexeafter referred to as cropmarks) as very few new sites have been recorded as earthworks in recent years in this area. The check could not include the vast number of vertical photographs held in the NMR's archives (which might reveal a higher percentage of

¹ D.R. Wilson, Air Photo Interpretation for Archaeologists (1982), Fig. 31.

² V. Fenner and C. Dyer, *The Thames Valley Project. A Report for the National Mapping Programme* (RCHME unpubl. report, 1994).

³ R.H. Bewley (ed.), Lincolnshire's Archaeology from the Air (SHLA/RCHME, 1998).



Fig. 1. The North Oxfordshire survey area.

earthwork sites over cropmark sites) or external collections held by other organisations or private individuals. However, the RCHME has been virtually the only organisation carrying out aerial reconnaissance over this area in the last few years and so it is unlikely that much evidence will have been excluded. It should also be noted that research to confirm that aerial photography was the first or sole evidence of a site's existence has only been carried out in a few instances; the definition of 'new' in this paper refers to any site for which there was no record in either the SMR or the NMR.

SURVEY and RESULTS

Aerial reconnaissance is one of the most cost-effective means of discovering new sites, but after 90 years of photography in England it is important to review its contribution periodically. The aim of this study was to see what impact the RCHME's reconnaissance had made in recent years by examining the pattern of discovery and quantifying the results achieved both numerically and in terms of the archaeological interpretation. To appreciate the rate of discovery in relation to time, the period over which photographs had been taken of cropmark sites was subdivided as follows:

1. Before 1967 (the year in which the RCHME began flying)

2. 1967-1976 inclusive

3. 1977-1986 inclusive

4. 1987-1995 inclusive

5. 1996

For the period before 1967 the NMR holds photographs of only 21 sites, mostly taken by Major Allen in the early 1930s. It should be noted that the majority of sites are clustered between Kidlington and Enstone, recorded most likely before the airfield at Upper Heyford was opened, and are on soils covering the limestone (Fig. 2).

The next period begins in 1967, the year the RCHME began its own programme of reconnaissance, during which a further 24 sites were discovered and these were recorded on a total of nine flights. Their distribution (Fig. 2) is quite different with about half the sites (in the S. of the area) on limestone soils and the remainder clustered to the S. and SW. of Banbury on relatively well-drained soils over iron stone. There are no sites anywhere near the Upper Heyford airfield which reflects the level of aerial traffic and consequent difficulty in gaining access. In addition to the Military Air Traffic Zone which is keyhole shaped, there was a much larger area extending almost as far as Cirencester to the W. which was designated an Area of Intense Aerial Activity. There was (and still is) an active airfield at Weston-on-the-Green just to the SE. of Upper Heyford. All these areas would have been difficult to enter on a regular basis and probably acted as a strong disincentive for any aerial reconnaissance.

In the next ten years up to 1986 a further 31 sites were discovered (Fig. 3) of which 20 were discovered in 1984 and a further six in 1986; all 31 sites were recorded on a total of seven flights. Again the sites are generally distributed in areas where none had been discovered previously.

The period from 1987 to 1995 saw a dramatic increase in the number of new sites discovered (Fig. 4). A total of 121 were added to the record of which all but four were recorded in just three dry summers; 62 in 1990, 30 in 1994 and 23 in 1995. The early 1990s were exceptional years for cropmarks particularly along the Middle and Upper Thames Valley and obviously over North Oxfordshire as well. Apart from the favourable weather, there were two other reasons for this dramatic increase in this area; the RCHME relocated its southern Aerial Survey team from London to Swindon, with flying now based at Kidlington, and the airfield at Upper Heyford closed in 1994, opening up a huge area to unrestricted reconnaissance. Many of the sites recorded near the airfield were found in either 1994 or 1995. In 1996, at least 80 new sites in the project area were discovered (Fig. 5), the greatest number ever discovered in a single year, bringing the total number of new sites to over 275 of which more than 200 had been discovered in the previous ten years. These discoveries are significant in that they are not adding new information to a known pattern, but are providing information about Iron Age (or earlier) settlements and land use which is completely new.











Fig. 4. Distribution of sites recorded up to 1995.



Fig. 5. Distribution of sites recorded up to 1996.

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The most striking revelation of the study was the rate at which discovery was increasing. One study of sites in two different areas of England⁺ concluded that after several years of reconnaissance the majority of sites will have been found and subsequently the discovery rate begins to fall at an ever increasing rate. However this really only applies to those areas that have been regularly, intensively and systematically searched over 30 years or more. This has not been the case in North Oxfordshire due to the problem of access into the airspace and also, at least in part, to its proximity to the gravel terraces along the Thames, which provide very favourable conditions for cropmarks and so have received more attention from airborne archaeologists.

An additional and important factor has been the number and intensity of hot and dry summers which directly affect the production of cropmarks where soil conditions are suitable. In the latter half of the 20th century exceptional summers occurred on average about once every ten years, in 1949, 1959, 1975, 1976 and 1984, except that there have been five such summers in the decade 1989-99 (1989, 1990, 1994, 1995 and 1996). We do not know the extent to which global warming and/or 'El Nino' may have affected the local weather but these last dry summers have certainly led to the discovery of an unprecedented number of new sites.

The geology and soils of the chosen area are fairly complex but it is useful to know where the best soils are in order to appreciate the extent to which they have determined the distribution of the discoveries. In general terms, the well-drained soils are planted with cereals and should have the potential for producing cropmarks, whereas the slowly permeable soils are more likely to be used for pasture and are therefore unlikely to produce cropmarks. The permeability of the soil is of course dependent on the underlying geological strata which in this area run approximately from NE. to SW. In the SE. of the area, to the E. of Kidlington and S. of Bicester lies the Oxford Clay where the soils are much less free draining. A little further to the NE. lies a band of Cornbrash, a shelly, rubbly limestone that is generally well drained. Further NE. lie the complex beds of both Great and Inferior Oolitic series which in the study area have their approximate northern limit from Chipping Norton through Middle Aston and Souldern, although there are significant outcrops between Chipping Norton and Tadmarton. The soils over these beds are shallow and very well drained. The rest of the area to the N. consists of beds of Upper, Middle and Lower Lias. The Middle Lias, which is of much greater importance as a surface feature, varies from a rusty calcareous limestone to an Oolitic shelly iron ore. These rock bands give rise to the rich red corn soil of North Oxfordshire which pass laterally into iron ore towards the Cherwell Valley where the ore has been extensively worked in the area S. of Banbury. The soils here are locally variable between the well drained and the slowly permeable as shown in Plate 1. Note that the soils on the Oolitic limestone have by far the greatest number of sites whereas the well-drained Cornbrash has very few sites and there are only a few sites on the Lias. Opening up the airspace has certainly facilitated aerial survey flights but perhaps more significant has been having flying operations based at Kidlington since 1991 which has enabled every opportunity to be exploited. The absence of sites in certain areas may not be due solely to adverse soils and crops, but since reconnaissance in recent years has been fairly systematic over the whole area the distribution of sites is thought to be representative of prehistoric settlement.

The second aim of the study was to see what types of sites had been discovered and how they contributed to our understanding of past archaeological landscapes. This was done by

⁴ R. Whimster 'Aerial Reconnaissance from Cambridge: a retrospective view 1945-80', in G. Maxwell, The Impact of Aerial Reconnaissance on Archaeology (CBA Res. Rep. 49, 1983).

firstly carrying out a rapid and simple classification based solely on the visual appearance of sites on the photography. A total of 277 sites were assessed and, for simplicity, classified in broad period categories, i.e. Neolithic, Bronze Age, Iron Age (and Romano-British) and Roman. The classification was necessarily rather simple but whilst some sites may be wrongly attributed the classification has been validated where subsequent fieldwork has taken place and these potential errors should not invalidate the general conclusions. In the next decade these sites will be re-assessed as part the National Mapping Programme; to date only four have been surveyed in detail, by Aerial Survey staff in English Heritage.

The interpretation of these sites is that the vast majority date from the Iron Age and Romano-British periods. With one or two exceptions those in the study area are relatively small and comprise domestic and agricultural sites which are here classified as either rectangular, curvilinear or 'banjo' shaped enclosures. 'Banjos' were categorized separately to see if the discoveries made on the previously mentioned flight of 12 July 1994 were indeed part of a significant new group for this area. Several of the sites discovered resembled 'banjos' (Plate 3) with no less than three recorded in a single field; their existence in this area had not been noted before. In this study the term 'banjo' has been used to encompass all those enclosures having at least one pair of ditches forming a corridor or funnel entrance to a circular or sub-circular enclosure. It will be seen below that there is tremendous variety in shape, size and complexity of these enclosures and the study aimed to examine the distribution of this subgroup of enclosures in particular. Other features which appear in small numbers such as linears and field systems have been classified as 'other sites' for the general distribution diagrams and are discussed separately below. Complexes are defined here as those sites with two or more enclosures and associated features in any one locality; there are 33 of these sites in the area.

The distribution of the 21 cropmark sites (classified by site-type) discovered in the period before 1967 is shown in Fig. 6. These include four plough-levelled round barrows (showing as ring ditches), presumably dating from the Bronze Age; seven rectangular, four curvilinear and one 'banjo' enclosure from the Iron Age, and four sites from the Roman period showing foundations. Only one site was classified as a complex (i.e. consisting of more than one feature).

The 24 sites discovered over the next ten years up to 1976 included five Bronze Age ring ditches, seven rectangular, seven curvilinear and two 'banjos', presumed to be Iron Age. Surprisingly, six of the Iron Age sites were complexes, mostly groups of either rectangular or curvilinear enclosures.

Discoveries over the next ten years, up to 1986 (Fig. 7), included two ring ditches, 11 rectangular, ten curvilinear enclosures and just one additional 'banjo' plus a number of sites of unknown date. Three of these sites were complexes. Up to this time the rectangular and curvilinear sites of (probable) Iron Age date had been discovered in approximately equal numbers and broadly similar geographical distributions. The complexes of these enclosures were similarly distributed. So far, most ring ditches had been discovered as single features with a few in pairs. The first aerial photography of a Roman site since 1949 revealed the typical rectilinear ditches of an enclosed farmstead.

The years 1989 to 1995 saw a dramatic increase in the number of sites discovered of all types (Fig. 8). Of particular note were 13 Bronze Age ring-ditch sites, in two small groups, one linear and the other nucleated. The discovery of no less than 25 new 'banjo' sites was particularly interesting together with a further 35 rectangular and 25 curvilinear enclosures. Sixteen of these Iron Age sites were complexes or groups of features. In addition, there was the discovery of the first new hillfort in the area near the village of Lower Heyford (see

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Fig. 9. Distribution of site types discovered in 1996.

below), and more aerial photography of sites from the Roman period revealed amongst other things an extensive field system SE. of Alchester.⁵

1996 was the best ever year for reconnaissance in the study area (Fig. 9) and it produced the first Neolithic causewayed enclosure for this area. A further eight Bronze Age ring ditch sites were found, and 30 rectilinear features, 16 curvilinear features, five 'banjos' and six linear features and/or fragments of possible field systems are thought to date from the Iron Age. There were further discoveries of sites dating from the Roman period including a small settlement and a possible camp.

DISCUSSION

The causewayed enclosure is situated barely 400 m. S. of Banbury on a south-facing slope of the Sor Brook valley and only a mile W. of the River Cherwell. It was recognised as a causewayed enclosure even though only a small section consisting of four segments of ditch was visible close to some farmyards (Plate 4). It has a diameter of approximately115 m.⁶



Fig. 10. Distribution of Bronze Age barrows visible as ring ditches.

⁵ E. Sauer, 'The Military Origins of the Roman Town of Alchester, Oxfordshire', Britannia, xxx (1999), 289-97.

⁶ R. Palmer, 'Interrupted Ditch Enclosures in Britain: the use of aerial photography for comparative studies', *Proc. of Prehistoric Soc.* 42 (1976), 161-86. See also A. Oswald, C. Dyer and M. Barber, *Neolithic Causewayed Enclosures in England* (forthcoming).

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The only certain cropmark evidence of human activity during the Bronze Age comes from the plough-levelled remains of round barrows. A scattering of extant barrows can be found to the W. of the River Cherwell but there are very few to the E. or in the areas in which they have been discovered as cropmarks; this means there is now a more even distribution of Bronze Age activity across the area (Fig. 10). Nevertheless the number of sites appearing as cropmarks (37) and the total number of individual burial mounds (53) is low compared with the river terraces just to the S.7 Most of the sites are single ring ditches and these are scattered across the study area although none have been found N. of Banbury. Some are situated near rivers but many are not. There are six groups with more than two ring ditches and interestingly these are all located relatively close to rivers. Four of these groups are nucleated, two are linear and each contains between four and seven ring ditches. Three of the groups have one 'elongated' enclosure, generally thought to be a type of long barrow and which would suggest they could date from the Early or Middle Neolithic. However, even including the extant barrows there is evidence for only about 100 barrows in the whole of the study area (about one for every 8 sq. km. or 0.11 per sq. km.) suggesting a fairly small and scattered population across the area.

By far the greatest number of sites discovered have been interpreted as Iron Age or Romano-British (Plate 2). As virtually no fieldwork has been carried out on any of these sites we cannot be sure about their date, function and inter-relationships. However, their varying shapes and ditch widths and the similarity of some distributions does suggest that they had different functions and were probably not contemporaneous. The 35 sites which here have been described as 'banjos' are particularly variable in form. They range from the simple, 'classic' banjo shape (Plate 3) through to enclosures such as the one near Fewcott (Fig. 11) where the ditches of the funnel entrance form a complex curving pattern linking with small fields or paddocks. Sites like this are very reminiscent of those found throughout Wessex on the southern chalk and also just a little to the S. in the Thames Valley at Watkins Farm, Northmoor and Mingies Ditch, Hardwick, where work by the Oxford Archaeological Unit identifies them as pastoral sites with the paddocks serving as areas for corralling stock.8 Between these extremes are sites of all shapes, sizes and varying degree of regularity. The site on Rollright Heath (Plate 3) is a fairly regular 'banjo' shape although it does have an unusual system of double-ditched antennae attached to it. Only a few of these enclosures incorporate paddocks and pens and these tend to be the larger ones. This suggests more activity and probably occupation over a longer period. The smaller, simpler enclosures appear to have been occupied for a single phase, probably for a specific pastoral activity. A surprisingly high number of sites have internal features, often one or more hut circles or more frequently pits which would suggest the main enclosure served a domestic purpose. It would appear that all these enclosures are situated exclusively on the well-drained soils over limestone whereas every other type of site can be found distributed on all geological/soil types.

The 63 curvilinear enclosures also vary considerably in size and regularity, and are distributed throughout the area on all soil types; many have obvious entrances, attached paddocks or fields and, like the 'banjos', may serve both a domestic and farming purpose. There are a few enclosures of simpler layout, with well defined entrances and sometimes with internal features, but one of the most striking aspects of many enclosures in this area is the total lack of symmetry in their layout (see Fig. 12).

⁷ D.N. Riley, 'Crop Marks in the Upper Thames Valley seen from the Air in 1942', Oxoniensia, vii (1942), 111-14.

⁸ R.H. Bewley, Prehistoric Settlements (1994).



Overlay to O.S. 1:2500 plan SP5228-5328.

Fig. 11. Banjo enclosure at Fewcott, Oxfordshire.

In general terms, rectilinear sites range from moderate sized, isolated enclosures to field systems. The enclosures may be rectangular with fairly sharply defined corners or may have more rounded corners such as the one near Lower Heyford (Fig. 13), many of which appear to have served a defensive purpose. Many of the smaller sites are located in the same field, such as those near Souldern (Fig. 14), and suggest either longevity of use (moving from one enclosure to another) or the beginnings of a hamlet. The most unusual and possibly unique site was discovered in 1996 near Kiddington (Plate 6). Is it the only rectilinear 'banjo'?

One of the most interesting sites in this area is the very large (265 m. maximum diameter) defensive enclosure near Lower Heyford (Plate 7). Part of it had been recorded previously in 1930 from a vertical photograph but it had not been recognised as a large treble-ditched enclosure. This site is located in a dominant position overlooking the River Cherwell and is



Fig. 12. Asymmetric features and more regular enclosures near Glympton, Oxfordshire. SP 4121/14. NMR 4633/22. NMR © Crown Copyright.

the only site of its type, visible as a cropmark, in the survey area; it is tempting to interpret it as a hillfort but parallels in central southern England are hard to find.

Unenclosed settlements are usually the most difficult to detect because they have such a small signature. A small group of pits disguised by geological or agricultural 'noise' can escape notice. However given favourable conditions sites such as the one near Over Kiddington can be identified by the symmetry of features such as the pits.

As previously mentioned, there were no discoveries of Roman sites between about 1950 and 1986. In the dry summer of 1990 the foundations of buried buildings affected crop growth and formed cropmarks which could be seen from the air. An extensive field system attached to the Roman road S. of Alchester was recorded that year, and additional features including the most revealing images of the Alchester Roman town were recorded in



Fig. 13. Rectangular enclosure near Lower Heyford, Oxfordshire. SP 4925/1. NMR 15519/33. NMR @ Crown Copyright.



Fig. 14. Square and rectangular enclosures near Souldern, Oxfordshire. SP 5230/7. NMR 15124/30. NMR @ Crown Copyright.

subsequent years and a composite plan produced by the RCHME in 1998.⁹ The excavated villa near Wigginton was recorded from the air for the first time in 1996; in addition to the main range of buildings there is another large building in the next field to the S. and some of the enclosing ditches are also visible. Just S. of Tackley, the rectangular boundaries and field system of what may be a Roman farmstead were discovered in 1986 but there was no sign of any buildings. There have been many surface finds on the Roman site at Sansom's Platt, Tackley but in 1972 a villa was discovered during the laying of a pipeline. In 1996 the site was photographed and can clearly be seen as a series of buildings on both sides of the spur road, perhaps more than a dozen in all, and the round building nearest Akeman Street is possibly a temple.¹⁰ The evidence from aerial reconnaissance, fieldwork and other sources shows there is not much evidence for Roman settlement in the area to the E. of the Cherwell, apart from around Alchester, and not very much on the limestone soils to the W. This contrasts with a greater concentration of Roman sites further W., especially in Gloucestershire.

CONCLUSION

This study has revealed new discoveries of approximately 275 sites, representing every period from the Neolithic to the Romano-British, all of which have been discovered through aerial reconnaissance. Details of the sites and their distributions have made a significant addition to our knowledge of the area which should greatly help our understanding of the historic landscapes and their inhabitants. Virtually none of these sites would have been discovered except through aerial reconnaissance and the pattern of discovery over the decades and especially over the past ten years demonstrates that there is not, as yet, any sign of a decline in the rate at which sites are being discovered. With the knowledge that now exists it will be possible to focus on those areas that have so far been unresponsive, but known sites also need to be revisited as prevailing conditions in hot summers may produce more revealing cropmarks that will further increase our knowledge and understanding. The recent merger of the RCHME and English Heritage provides an opportunity for a multidisciplinary project to test the environmental history of the area and the date and function of the sites identified by this project. Very recent analysis and fieldwork by Richard Massey11 supports some of the tentative dating proposed here. His ongoing research raises questions about the proximity of banjo enclosures, linear features and square enclosures. It explores the influence on the settlement pattern inside and outside the circumference of the Grim's Ditch in the Iron Age and Roman periods.

⁹ E. Sauer with S. Crutchley, 'Alchester: A Roman Fort and Parade Ground', *Current Archaeology*, 157 (1998), 34-7.

¹⁰ H. Winton, 'A Possible Roman Small Town at Sansom's Platt, Tackley, Oxon.', Britannia, xxxii (2000) (forthcoming).

¹¹ R. Massey, 'The North Oxfordshire Grim's Ditch: Cult, Status and Polity in the Late Pre-Roman Iron Age' (Bristol Univ. unpubl. MA thesis 1999).

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Plate 1. Distribution of sites in relation to soils.

Plate 2. Distribution of possible Iron Age enclosures, in relation to soils.

10km



Plate 3. Banjo-type enclosure near Ardley, Oxfordshire. SP 5227/12. NMR 15350/24. NMR © Crown Copyright.



Plate 4. Neolithic causewayed enclosure, near Banbury. SP 4538/5. NMR 15517/34. NMR © Crown Copyright.



Plate 5. Banjo enclosure at Rollright Heath, Oxfordshire. SP 3431/12. NMR 15350/33. NMR @ Crown Copyright.



Plate 6. Rectangular enclosure, with internal hut circle and trackway, near Kiddington, Oxfordshire. SP 4124/10. NMR 15460/29. NMR © Crown Copyright.



Plate 7. Treble-ditched circular enclosure, Herberowe Bank, near Lower Heyford, Oxfordshire. SP 4924/17. NMR 15350/18. NMR © Crown Copyright.



Plate 8. Sansom's Platt, Roman roadside settlement. SP 4518/5. NMR 15456/15. NMR \circledcirc Crown Copyright.