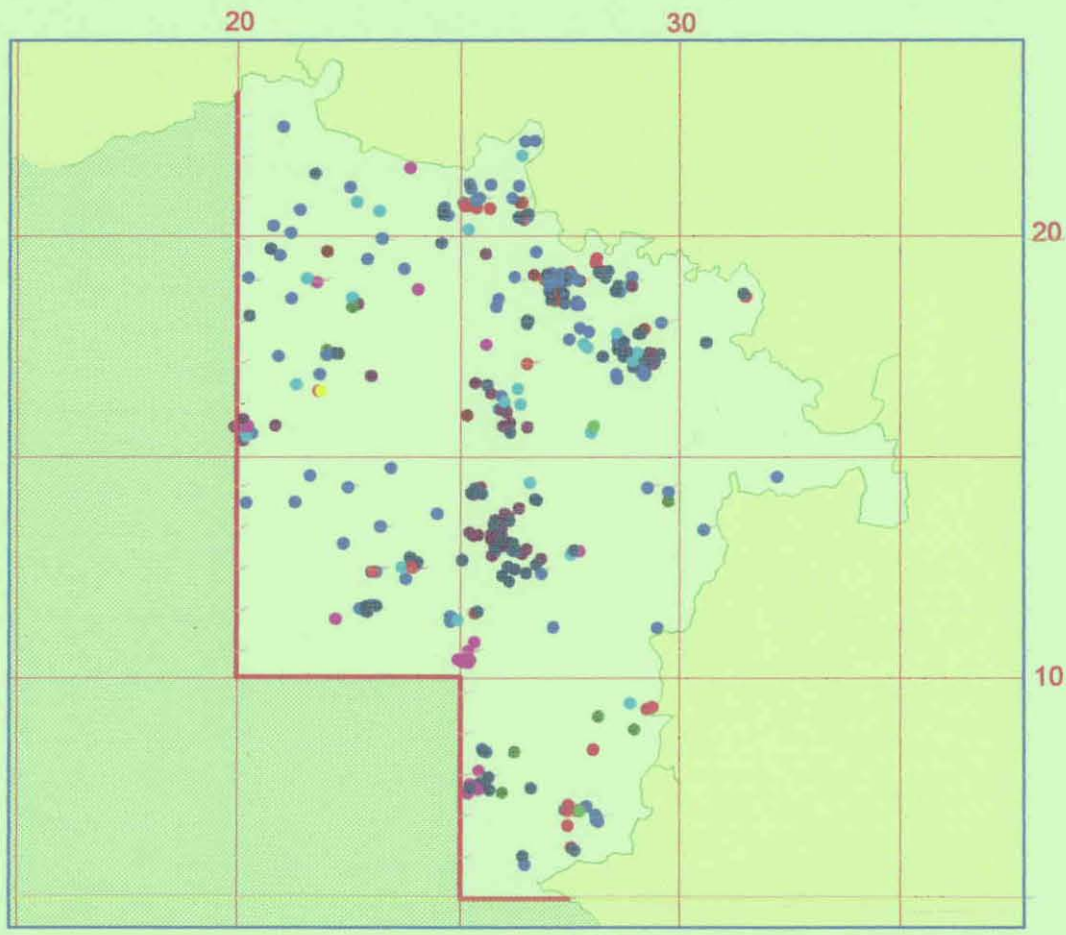
THE CLWYD-POWYS ARCHAEOLOGICAL TRUST

Montgomeryshire AP Mapping Project

Report on 1996-7 programme



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Montgomeryshire AP Mapping Project

Report on 1996-7 programme

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Report for the Royal Commission on the Ancient and Historical Monuments of Wales

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1. Introduction

1.1 The Montgomeryshire AP mapping project is part of the Royal Commission's external aerial photograph mapping programme. The project is intended to study all availlable aerial photographs relating to the old county of Montgomeryshire.

1.2 The 1996-7 programme, funded entirely by the Royal Commission, covered four quarter sheets in the north-east of the county, namely SJ21SE, SJ21SW, SJ21NE and SJ21NW, as well as the partial quartersheets SJ22SE, SJ22SW, SJ31NW and SJ31SW (Figure 1). The 1995-6 programme had partly covered these sheets during mapping of small enclosure sites. Funding was later secured to extend the survey to cover SJ20NE.

2. Sources

2.1 *Oblique Collections*

2.1.1 Three collections of oblique photography were consulted, namely those of CPAT, the Royal Commission and the Cambridge University Committee for Aerial Photography (CUCAP).

2.1.2 The CPAT collection is held at the offices of CPAT in Welshpool and consists predominantly of black and white prints and colour slides dating from 1975 onwards. Archive prints of all black and white photography are held from 1979, with patchy cover before then. For mapping purposes the primary source was the black and white print archive. Colour slides were consulted where no black and white coverage was available or where further detail was needed. Searching for the photographs was undertaken using CPAT's FoxPro AP database, accessed through the MapInfo GIS system.

2.1.3 A search of the RCAHMW's oblique collection of colour slide and black and white photography was undertaken by Chris Musson and relevant photographs were loaned to CPAT. Again the primary source was the black and white collection with reference made to the colour sources when needed.

2.1.4 CPAT holds selected prints from the CUCAP black and white collection. The collection was originally searched in the late 1970s for sites in Clwyd and Powys. Since then copies have been acquired on a piecemeal basis related to project work. The collection at CPAT is therefore likely to be incomplete. The copies held by CPAT are included in CPAT's FoxPro AP database and searching through MapInfo was carried out at the same time as searching in CPAT's collection.

2.2 *Vertical Collections*

2.2.1 A cover search of the collections held at the Welsh Office Central Register of Aerial Photgraphy for Wales was requested for all sorties covering Montgomeryshire at a scale of 1:20000 or greater. This included RAF photography from the late 1940s, Ordnance Survey sorties from 1971 to 1995, and private soties by J. Storey and Geonex. Frames relevant to the 1996-7 programme were identified and a search of copies held at RCAHMW's offices was made to establish the quality of the photography. A request was then made by RCAHMW to the Central Register for the loan of selected prints. These were included all the 1948 RAF photography (Sorties 541/214 and CPE UK 2492) which

contained an exceptional amount of earthwork detail as they were both taken in low winter light before much damage had been caused by intensive post war ploughing. The loaned prints were in incomplete runs with significant gaps in the north-eastern and southern parts of the survey area.

2.2.2 The 1948 RAF vertical photography contained an overwhelming amount of detail, which could not be mapped during the 1996-7 programme. Transcription of selected sites, including Collfryn (PRN 3603) and the New Pieces field system (PRN 1258) was undertaken, as well as a test transcription of all the sites off one photograph (CPE/UK/2492-3253). A conservative estimate of the time taken to digitise, sketch plot, and database one photograph is one and a half days. Time did not allow spot records to be made of significant sites, but photocopies of the prints were made which have been placed in the SMR for future reference.

2.3 *Digital Map Base*

2.3.1 CPAT has the use of a copy of the 1995 OS digital map data for Powys from Powys County Council. The digital data was invaluable for the project, allowing accurate mapping against the most up to date map base. Much of the small enclosures data mapped against the OS 1964 1:10560 during the 1995-6 AP mapping project had to be re-digitised during this years project.

2.3.2 The digital map used for the 1996-7 programme is based on a series of 1:2500 1km tiles arranged into a series of MapInfo tables. These were converted into FastCAD format by DXF and stored as quarter sheets.

3. Methods

3.1 *Introduction*

3.1.1 The availability of the OS digital map data and the MapInfo GIS package led to variations in the methodology from those used in the 1995-6 project. The main differences are outlined below.

3.2 *Digitising.*

3.2.1 Extracts of the OS digital maps were exported using DXF into AutoCAD format. When transferring a small extract there was generally no problem, and the AutoCAD drawing retained the colours and layering of the FastCAD drawing. Larger files did not always import into AutoCAD. When this occurred the DXF file was imported into PENMAP, then immediately exported back into DXF format. PenMap DXF files always imported into AutoCAD, although the colouring and layering was lost.

3.2.2 The extract from the OS digital map data was stored in an AutoCAD drawing called RECTIF. This was then imported into individual AutoCAD rectification drawings using XREF. When the relevant plot had been digitised the XREF drawing was removed before the plot was exported into FastCAD. When a new site was being rectified the extract of the OS digital map was copied into the RECTIF drawing, the former extract in the drawing having been erased. This prevented the build-up of large DXF and AutoCAD files.

3.2.3 It was felt that the importing of the OS data extract into the AutoCAD drawing allowed more accurate digitising. The scale of the base map became in effect as large as the

digitising tablet. While this may lead to false accuracy (because it is dependant on the accuracy of the OS plot and the size of the source photograph), it was felt that a general increase in the accuracy of the plot was obtained by allowing a more accurate registration of the control points.

3.2.4 Rectification plots were produced on a 1km square basis. Separate plots were stored in separate layers, allowing different colours to be used. These layers did not convert into FastCAD layers, but the colours were retained, allowing easy reference at the sketch plotting and databasing stages. Text notes were made in AutoCAD, again related to the digitised source layer.

3.3.5 Rectified plots were imported into FastCAD through DXF. The drawings were given the relevant km square reference prefixed with RC. When the plots had been rectified the FastCAD 'unit spec' was converted into metres, so that scaling by 39.370 was not necessary every time the plot was imported into the AP map drawing.

4. Sketch Plotting

4.1 Sketch plotting was carried out as outlined in the RCAHMW project guidance notes Air Photo Mapping and Record Creation: Methodology - Extended Notes (Revised July 1996).

5. Database Creation

5.1 Database creation was carried out using the MapInfo GIS system. This was partly because the CPAT FastMAP system was not working properly, and partly because, as it is a Windows programme, there was no problem with shelling between programmes. MapInfo is compatible with the FoxPro DBF format and will write directly to it. As with FastMAP there are no 'memo' fields so the descriptive text was written into a character field.

5.2 The MapInfo system does not record grid references or co-ordinates when it creates a new record. The co-ordinate columns therefore have to be updated from the map centroid file. NGR references and map sheet numbers were updated in FoxPro.

5.3 The AP database passed to RCAHMW follows the END core fields format. It includes references to all sites edited by CPAT as part of the project. The descriptive text of the sites is based solely on information gained from the AP. Where sites have been excavated this has been noted. Fuller notes on existing PRN's based on field visits etc are retained in CPAT's SMR.

5.4 The FastCAD sketch plotting files were exported using DXF into a MapInfo table. In doing this the file lost its layering and fill styles. This made it difficult to differentiate between, for example, banks and ditches/negative features. This problem was overcome by printing a plot of the FastCAD file for reference during databasing.

5.5 The rectification plots were converted into a MapInfo table so that they could be viewed during databasing. The conversion retained the colours of the plots.

5.6 The MapInfo AP map table will need a little work so that it can be incorporated into CPAT's SMR MapInfo GIS system. MapInfo is the GIS system currently used by the SMR.

6. Results

6.1 2,054 photographs were studied from the CPAT and CUCAP collections as well as 46 from the RCAHMW collection and around 80 verticals from the Central Register, from which 350 records were either created or edited (Figure 2). The project also enabled the 'tidying' up of various aspects of the SMR, including the Four Crosses complex and allowed the re-interpretation of known sites.

6.2 218 new sites were identified during the project, including 12 ring ditches, 14 pit alignments, 26 enclosures, a series of medieval fishponds and the precinct boundary of Strata Marcella Abbey. Relatively well known sites were re-interpreted, including the New Pieces field systems on the Breidden, Collfryn small enclosure and Strata Marcella Abbey.

6.4 At Four Crosses the mapping project allowed the re-evaluation of the ring ditch and pit alignment complexes (Figure 3). Four new ring ditches were identified, one of which (PRN 38091) lay in a field adjacent to the excavations of 1984. The site, photographed in 1983, has subsequently been built over. Another ring ditch, PRN 38096, now lies within an industrial park. The mapping of the pit alignments suggests that in places the alignments were replaced with ditches, which in some cases are associated with small rectangular enclosures (PRN 7065, PRN 7531 and PRN 38097). A number of new alignments were noted including one, PRN 38123, which appears to link alignments either side of Offa's dyke.

6.3 At Collfryn (PRN 3603) the 1948 vertical photographs showed the entire defences of the enclosure as standing earthworks, before they had been effected by post war ploughing. All other photography of the site had shown the eastern part of the site as simply cropmarks. At New Pieces the field systems (PRN 1258) between the enclosure and the larger fort on the Breidden showed on the 1948 photography and indicated that the survey carried out in the 1930s by O'Neil (O'Neil, 1937) was partially inaccurate. The 1930s survey was until recently the only record of the site as the earthworks were covered by afforestation in the 1950's.

6.5 A series of features near Trefnanney previously noted in the SMR as a post medieval field system (PRN 7000) were identified as a complex of medieval fishponds and leats. They were probabaly associated with the cistercian grange known to have been established at Trefnanney. At the cistercian monastery of Strata Marcella (PRN 1253) the rectification of the earthworks created during excavations in the 1890s allowed an accurate positioning of the excavated remains. The previously unidentified precinct boundary was also identified as was a significant hollow way approaching the abbey from the north.

6.3 Many of the small enclosures mapped as part of the 1995-6 programme were re-digitised as part of this year's programme. The registration of many of last year's sites when viewed against the OS digital background was significantly out. This is probably due to the inaccuracy of the printed 1:10000 or 1:10560 base maps used during that programme. Other sites had additional information which was not mapped during last year's programme because they were not considered part of the site. Also it was felt that the accuracy of the plots could be improved using the digital OS data. The data provided during this project should supercede that from the small enclosures part of last years project.

6.4 The site plots and database will be incorporated into the SMR. Already the information has been used for Development Control purposes.

7 Conclusions

7.1 The project has exceeded expectations both in the quality of data and the number of new sites identified. As well as adding to our knowledge of the archaeology of this part of Montgomeryshire, it is felt that, particularly in an area of relatively intense development such as the upper Severn valley, the project will make a significant contribution to the conservation of the archaeological resource.

7.2 It is expected that the extension of the project to other areas in Montgomeryshre will have an equally beneficial effect.

8. References

O'Neil, B.H.St J., 1937 Excavations at Breiddin Hill Camp, Montgomeryshire, 1933-5, *Archaeologia Cambrensis*, **92**, 86-128

APPENDIX

Timings

Total Timings per quartersheet:

SJ21NE	15 days	(7 days identification of sources and digitising, 6 days sketch plotting, 2 days databasing)
SJ21NW	7 days	(3 days identification of sources and digitising, 3 days sketch plotting, 1 day databasing)
SJ21SE	7 days	(3 days identification of sources and digitising, 3 days sketch plotting, 1 day databasing)
SJ21 SW	7 days	(3 days identification of sources and digitising, 3 days sketch plotting, 1 day databasing)
SJ22SE	3 days	(2 days identification of sources and digitising, 1 day sketch plotting, 1 day databasing)
SJ22SW	2 days	(1 days identification of sources and digitising, 0.5 days sketch plotting, 0.5 days databasing)
SJ31NW	1 day	(0.5 days identification of sources and digitising, 0.25 days sketch plotting, 0.25 days databasing)
SJ31SW	1 day	(0.5 days identification of sources and digitising, 0.25 days sketch plotting, 0.25 days databasing)
SJ20NE	5 days	(2 days identification of sources and digitising, 2 days sketch plotting, 1 day databasing)
Total	46 days (plus 2 days setting up).	

Total Timings per task:

Setting up (Identification of sources, monitoring, reporting etc)	**2 days**
Identification of sources and digitising (tasks not divided as sources were identified and collected during digitising):	**22 days**
Sketch Plotting	**16 days**
Databasing	**8 days**
Total	**48 days**

Figure 1: Area covered during 1996-7 programme. (Not to scale)

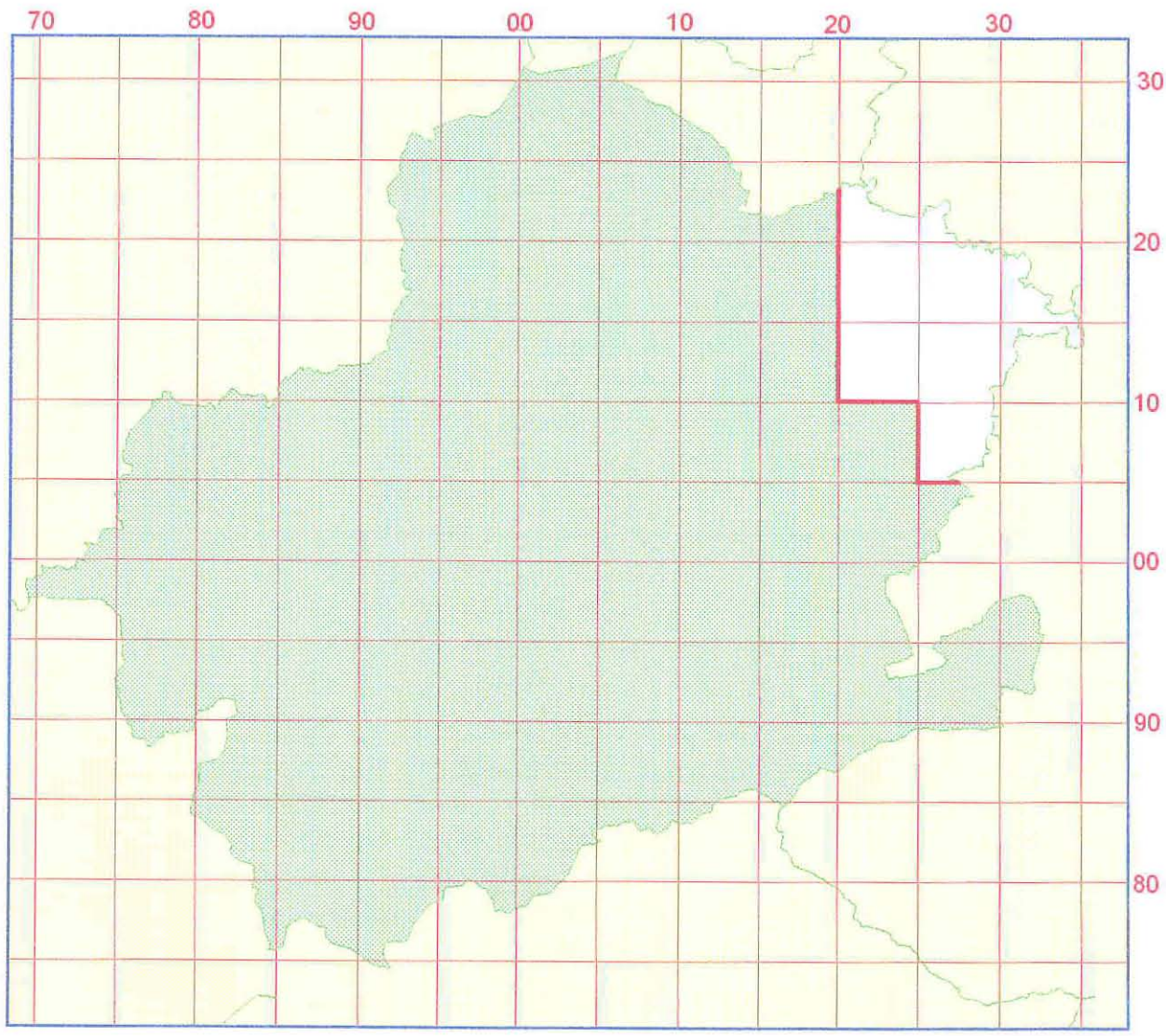

Figure 2: Location of sites by period

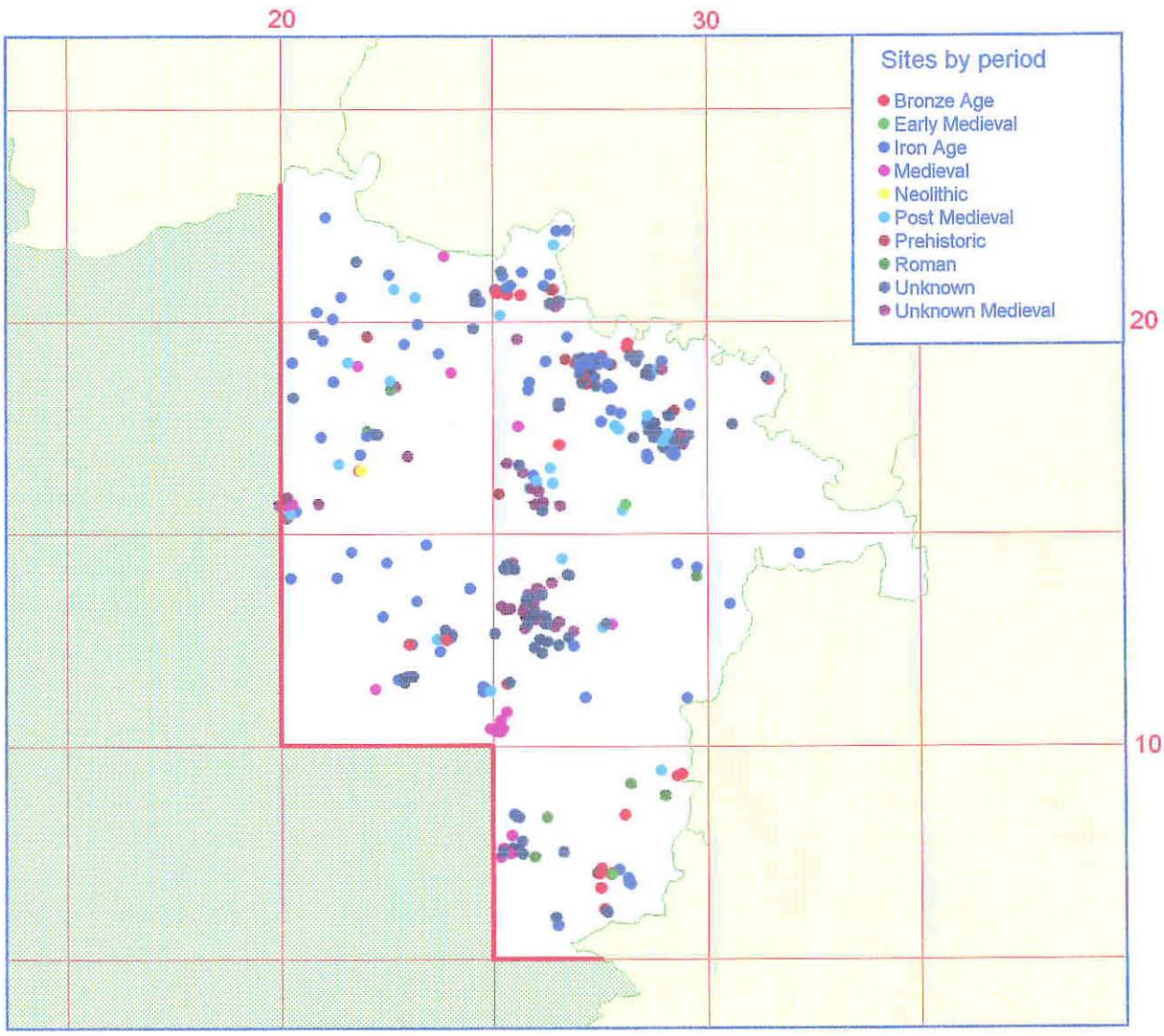

Figure 3: Four Crosses ring ditches and pit alignments (centered on SJ27191900; not to scale)