Aerial archaeology in Bohemia at the turn of the twentieth century: The integration of landscape studies and non-destructive archaeology

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1. ABSTRACT

The paper brings a set of information on principle aims, strategy and results of aerial archaeology in Bohemia, Czech republic, with special respect to its meaning in the study of past landscapes and settlement patterns. Principal characteristics of landscape archaeology and aerial photography in the introductionary part are followed by brief comparison of different level of aerial archaeology in western and eastern Europe ten years ago - when this discipline started to be effectively applied by countries once hidden beyond the Iron Curtain – and today. The main part of the paper brings thoughts on current development of aerial archaeology in Bohemia as represented by two country's leading projects, one in the Institute of Archaeology, Czech Academy of Sciences (Prague) and one in the Contract Archaeology Unit for North-West Bohemia (Most). A short notes on strategies and a review of the most important results achieved in these projects are also included.

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2. INTRODUCTION

Aerial photographs, as they have been evaluated by archaeologists since the 1920', constitute a foremost set of information for the study of past landscapes. The use of both obliques and verticals has shifted the mainstream archaeology from cultural history and studies of single sites toward the cognition of space and processes inside cultural landscapes. Aerial reconnaissance perspectives as they emerged in central/eastern Europe after the decline of the Iron Curtain have so far been uncovered slightly by a few archaeologists. Bohemia is one of the countries where the meaning of aerial archaeology has been recognized both by specialists and by *academia* officials. In the first half of the 1990' the attention of most archaeologists in this country tempted by aerial survey was focused on the identification of as many cropmark sites as possible and partly also on methodological aspects. Currently two main aerial projects in Bohemia are incorporated into large-scale settlement studies of assorted landscape units. The set of information assembled from air reconnaissance is considered to be one part of the whole database to be collected and analysed. Thus, aerial archaeology is now integrated into the solution of principal theoretical problems as they have been defined by Czech settlement archaeology recently. At the same time it is the non-destructive character of air reconnaissance which is currently appreciated. Actually the combination of different non-destructive methods of survey complemented by test excavations on sites of special interest are applied as a standard field methodology.

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3. LANDSCAPE ARCHAEOLOGY AND AERIAL RECONNAISSANCE

The landscape approach to archaeology is the alternative to the central European tradition of the so-called settlement archaeology in at least three points:

1. Its interest in large territorial units makes it possible to study settlement processes in either areas of ineterest (limited oeither by geomorphology, hydrology or administratively) or in analytical units of former community areas. It is one of the primary tasks of current archaeology to bring models - and to test them in the field - of how social structure have shaped the space – the landscape – in which past communities lived, how the ideas and practice of our ancestors have been embeded in landscape.

2. In the analyses of cultural landscape not only sites and monuments, but also components of the past living culture which have not been preserved (or which are not traceable by traditional approach) are taken into account by landscape archaeology.

3. It applies non-destructive methods of data collection. With respect to the objectives of landscape archaeology (e.g. a diachronical development of settlement activities in a defined area, the reconstruction of settlement patterns, continuity/discontinuity of settlement areas, etc.) the use of these methods brings results hardly available by traditional ways. This kind of data collection is much more careful to archaeological heritage and may contribute to the protection of sites and monuments.

Aerial archaeology's aim is to perform reconnaissance of landscapes (large spatial units) from bird's eye view, to record and archive new data, to make photographic documentation of buried (or semi-buried) and standing monuments of cultural landscape, and to process the data for further application in both theoretical work and heritage management (protection). The information on buried landscapes extracted from aerial photographs constitute a specific evidence on the character and distribution of settlement activities from prehistory through to the modern period. Most of the sites recorded by means of non-destructive landscape survey techniques (i.e. remote sensing/air photography, field walking/surface collection, geophysical measuring) have not been excavated, and therefore they must be treated accordingly.

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4. THE WEST AND EAST

No issue in the world of archaeology has been so symbolically reflecting the once divided Europe as aerial archaeology. Huge libraries of air photographs with innumerable quantity of oblique images taken for the purpose of archaeology and landscape studies in countries like UK, France and Germany, a long-standing tradition of transforming interpreted data from images to maps, and finally methodological development have been in a sharp contrast to the poor state (or better non-existence in most cases) of aerial archaeology in the world behind the Iron Curtain. Although there were some few scholars who in the former soviet countries had been trying to open this forbidden world of cognition (see e.g. *Bálek 1995; Kovárník 1995; Visy 1997*), the proper challenge came at the beginning of 1990' when communist regimes ceased to exist in Europe.

The question is how far the ten years that elapsed since the challenge was raised changed aerial archaeology in Europe. Is one decade long enough for a discipline such as aerial archaeology to enable the pioneers to catch up on specialists from the West who have had a seven-decade advantage. Obviously not. It would be misleading to come with a general comparison of how far the progress in central/eastern Europe reduced the distance between the former counterparts. The discipline is too wide and includes many sub-disciplines. It would be more effective to evaluate them separately and analyze the quality and intensity of air survey, the post-reconnaissance procedures, archiving etc., and also issues such as teaching aerial archaeology at universities, publication- and exhibition activities. Perhaps most important is to pass judgement on how far aerial archaeology in countries in both halves of Europe has been accepted by professional communities, whether the discipline has been integrating into the common agenda of prehistoric and medieval studies and whether the data generated and offered by aerial archaeology are used in a similar way and frequency as are, for instance, the plans of excavated sites, photographs and drawings of features or objects.

One of the important activities to be evaluated is the communication among scholars throughout Europe. In this respect aerial archaeology stands perhaps on the foremost position. Just a few examples: The British *Aerial Archaeology Research Group* (whose website has symptomatically been compiled in, and operated from, Vienna) was gradually transformed to international forum numbering many scholars from both the West and East, and organizing its annual meeting 2001 – for the first time in its history - out of the British soil, in Austria. An international project From the Air – Aerial archaeology in central Europe supported by the European Union through its program Raphael (Czech Republic, 1997), two training summer courses in aerial survey and data processing (Hungary 1996, Poland 1998) and finally the 2000 NATO conference/workshop in Poland – they all were organized by a group of scholars who are promoting the introduction and development of aerial archaeology into the practice of their national archaeologies.

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5. BOHEMIA, CZECH REPUBLIC: CURRENT PRIORITIES IN TWO LEADING AERIAL ARCHAEOLOGY PROJECTS

Although there were sporadic attempts to use aerial photographs, or even to organize „flights into yesterday“, the application of aerial photographs and the practice of air reconnaissance were introduced to Czech (or better Bohemian, as we do not consider Moravia in this context) archaeology as late as the beginning of 1990’. The „prehistory“ (1920’ – 1990’) and „modern history“ (1990’) of the discipline in Bohemia have been described elsewhere, both in brief (*Gojda 1993* and *1995*) and in detail (*Gojda 1997*). The aim of this contribution is not to repeat published data but to point to current trends in aerial archaeology as they are discernable in two major projects of the country.

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5.1. The background

Since the beginning of 1990' two centres of aerial archaeology have been established in Bohemia, one in *The Institute of Archaeology, Czech Academy of Sciences* (Prague) and one in the *Contract Archaeology Unit for North-West Bohemia* (Most). The programmes of both these institutes have been developing in a similar way due to close contacts between the present author (responsible for the Prague project) and Z. Smrž (responsible for the Most programme). In the first years the priority was to learn how to indentify sites from the air (especially crop-marked, but soil-marked as well) and, specifically, how to distinguish archaeological evidence from geological marks and also from imprints of modern cultivation techniques. We neither had experiences in taking photographs from aircraft, nor training in map navigation. The primary directive of those times was to collect images of buried sites as much attractive as possible. In other words, recording of enclosures such as ring- or rectangular ditches was the best way to persuade the public that principles of site detection work in this country in the same way as elsewhere. Let me stress that most importantly we had to submit positive results to scholars (archaeologists and different social scientists) who have been members of state commissions deciding upon funding research projects. In this respect we did a good job and the Prague Institute's aerial program has been financially supported since 1994 continuously. On the other hand the Most project is almost completely financed by coal mining corporations and construction companies as most of flights have been performed in threatened territories. This is an excellent example of how theoretically based landscape study can be linked with rescue contract archaeology.

There was a positive moment in both programmes at their beginning, namely the fact that their heads had been involved in landscape regional and settlement study before aerial archaeology was introduced to Bohemia. Z. Smrž performed an extensive rescue project (1970'-1980'; less intensively the survey has been continued until now) in the territory of large-scale destruction of stream valleys in the area of open-cast brown coal mining in north-west Bohemia and used the data he collected in the field for modelling the settlement pattern and for reconstructing prehistoric landscape of those valleys (*Smrž 1987* and *1994*). M. Gojda was working on the reconstruction of early medieval settlement pattern in the vicinity of important hillforts in central Bohemia (*Gojda 1988*). A significant constituent of his project in its field part was the application of ploughwalking. The potential of this prospection method for regional landscape work, including general thoughts upon the effectivness of ploughwalking in archaeology, was published (as one of the first on this theme in Bohemia) in a separate work (*Gojda 1989*). Consequently, it is the utility of aerial survey in landscape studies of micro- to mezorigional level which was evaluated as the most important by leading representatives of aerial projects in Bohemia.

There are some few other archaeologists who are involved in aerial reconnaissance in Bohemia. They are mostly focused on work in their regions. The raising nmber of them is a trend which should be appreciated.

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5.2. Common characteristics and differences

The following characteristics can be traced in both Czech leading projects:

a) Understanding of aerial survey as one of the most important data collection methods in landscape- and settlement pattern study;

b) Data on aerial images are to be evaluated not as such but in respect to how useful they are for the solution of theoretically defined problems current archaeology deals with; consequently the way primary data are to be processed and handled is not formal but depends on a strategy and type of analysis such a problem is solved; data must be pre-processed. i.e. interpreted, and basic facts - such as the site topography and morphology, date of photography, archive No. of slides and negatives, etc. recorded in a database;

c) A combination of results from air survey with data gathered by other methods of prospection in large spatial units, such as fieldwalking, and the application of geophysical survey in selected sites are of primary importance; the meaning of these methods, apart from the fact they are irepleacable for landscape research, consists in their non-destructivity;

d) Geographically both projects are determined to regions in the most fertile lowlands (middle- and lower basins of main Czech rivers) which during prehistory were the most intesively inhabited territories.

e) A significant element of both projects is the application of excavation on carefully assorted sites, with preference to threatened ones. Excavated are primarily types of features (usually enclosures of varied size and date) which have not been recorded (nor excavated consequently) yet in this country. By now 5 sites in the Most territory have been rescue-excavated in the 1990' and another ten are on the list to be excavated soon. All these field activities have been performed as contract performances. This is perhaps the main focus of the Most project: data recorded from the air are to be explored on the ground by money of those whose construction activities destroy them. The Prague programme has included excavations at 5 sites between 1997 and 2000 and the activity in this respect will increase in close future.

f) The projects tend to consider methodology as their important component and to define principal strategies of air survey with respect to experiences as achieved during air-reconnaissance campaigns, and to evaluate the effectivness of this special prospection method in general terms, and particularly in Czech landscapes.

Differences between the two projects are obviously based in diverse missions and characters of the Prague and Most institutes. In addition to different financing (see above) it is also closer links of the Most project to construction and extraction activities, and to rescue archaeology respectively which distinguish the operation regimes of both projects.

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5.3. The north-west Bohemia project

Since 1992 when the aerial archaeology project was launched the view of past settlement patterns in areas selected as potentially favourable for air survey radically changed. These areas are situated in the basin of the main north-west Bohemia river, the Ohře, and in its tributary stream valleys. This is a typical sand/gravel region in which extraction have accelerated since the early 1990'. The situation can be compared to what happened in UK in 1950' when sites on river gravels started to be destroyed at an alarming rate (*Royal Commission…1960*; *Gates 1975*). For example, almost 12% of landscape in one of the most intensively surveyed areas have been destroyed completely by gravel/sand extraction.

A recent evaluation of the hitherto achieved data indicate that aerial survey in north-west Bohemia is a very effective method for getting ideas on the archaeological potential of a landscape transect. For example, in a 32 square km microregion situated on the confluence of the Ohře river and its tributary stream Liboc, 32 new sites have been identified during less than 5 flying hours (in a four-year period): this supports the concept that landscape is more or less continuously infilled by traces of past human activities rather than it is a place with single sites. The 32 settlements found by aerial reconnaissance over the 4 years, compared to 18 sites discovered by excavation and surface survey over 13 years, are indisputable evidence of the effectivness of this new method as applied in that part of Bohemia. On the level of the whole north-west Bohemia territory the total number of sites recorded by means of aerial archaeology between 1993 and 1999 is 400 (personal comm.). Of these 234 (personal comm.) were plough-walked. A sophisticated comparison of existed ground archaeology databases of the Most Institute with data from aerial archive have shown that during several decades of archaeological activity in the studied territory only less than 30% of sites identified from the air have been also known from ground excavations and survey (*Smrž 1999* and *in press*).

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5.4. The Prague programme

The programme of aerial survey and photographic documentation of historic landscapes is one of the themes defining the work of the Institute of Archaeology, Czech Academy of Sciences (IoA in the following text), Prague. It is part of a strategy of matching non-destructive techniques in archaeology to the needs of theoretical research and protection of the cultural heritage. This strategy has been applied to spatial archaeology since the early 1990'.

Three primary aims of the aerial archaeology programme in IoA are discernable in its agenda:

1. **Theory**. To further to the theoretical formulation of questions regarding landscape and settlement archaeology – the resolution of which is one of the basic tasks of Ioa – to conduct aerial surveys, to identify new settlement areas of prehistoric and/or medieval age, and to both map and process information about settlement topography. Apart from supporting archaeological theory it is also the protection of cultural heritage which is of importance.

2. **Methodology**. To generally deepen the methodological relationship between aerial archaeology and other non-destructive prospection methods.

3. **Archiving**. To gradually create a central record of aerial discoveries and documentation of sites and landscapes. This record is managed under the general name of the Aerial Photograph Archive, which comprises a library of aerial photographs together with archive of negatives, compact discs and digital video recordings, and textual & image databases.

Following is a short overview of main achievements to date: 1. A substantial increase in the number of known settlement locations, particularly in central and eastern part of north-west Bohemia. This relates in particular to those parts of landscape with well-formed terraces of light, sandy soils, specifically along the middle and lower basins of great Czech rivers such as the Vltava, the Labe, and the Ohře, and their tributaries. By today about six hundred sites have been identified through crop- and soilmarks. 2. The discovery of new types of features, the existence of which in the Czech historic landscape was virtually unknown. These are enclosures, or ditches (both single and multiple) and palisade trenches that demarcate a particular area (usually round or oval in plan), often with interrupted entrances. The diameters of such features vary from several metres to several hundred metres. 3. The identification of new (unknown before) fortified upland locations (hillforts). 4. The management and permanent enlargment of an archive of aerial photographs and digital video recordings of Czech historic landscapes, or individual categories thereof (buried settlement areas, traces in relief of prehistoric features, castles, fortified manors, chateaux, historic town centres, villages, monasteries, solitary churches, etc.) and landscape settlement zones/ecozones. The archive contains images of more than one thousand sites.

In 1997 the IoA published a monograph book on aerial archaeology in Bohemia, its history and results of the 1992-1996 campaigns.

As IoA is primarily a research body the principal aim of the aerial archaeology programme is to apply its data in landscape- and spatial archaeology themes. Currently the programme constitutes a main part of a long-term landscape project *Prehistoric Settlement Patterns in Bohemia* whose aim is to study the relationship of prehistoric communities to the natural environment, and the reconstruction of cultural landscape, to rearch for the structure of the settlement network and its diachronic changes with regard to the demography of prehistoric populations, to identify the areas of activity (residential, ritual, production) and their relationships with the aid of the community area theory, and to evaluate critically basic sources of information used in the project, with regard to the individuality of particular regions and periods.

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6. CONCLUSION

The integration of aerial survey to the practice of Czech archaeology has brought new dimension to archaeological prospection and, consequently, to the understanding of prehistoric settlement and landscape structure. Most important is perhaps the fact that in

Bohemia new types of features have been identified, the existence of which remained unknown to Czech prehistoric and ancient/medieval studies until 1990'. Apart from quality of archaeological sources it is also a huge increase in number of sites in particular areas, namely in those belonging to the traditional settlement regions in basins of main Czech rivers. These are closely watched through a currently performed long-term project on settlement patterns. The results of continuous aerial reconnaissance contribute decisively to the solution of principal problems on the evolution of settlement forms and structures in prehistoric Bohemia, and – at the same time – are used for photographic documentation and heritage protection throughout the country.

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