

## Aerial Archaeology in Jordan

Since 1998, the Academy has awarded small research grants to support a project in Jordan, conducted jointly by **Dr Robert Bewley**, Head of Aerial Survey at English Heritage, and **Professor David Kennedy** of the Department of Classics and Ancient History in the University of Western Australia. They describe their work below.

The aerial surveys of Antoine Poidebard SJ in Syria and Sir Aurel Stein FBA (Figure 1) in Iraq and Transjordan in the 1920s and 1930s were pioneering, but never developed. Indeed, in most of the Middle East it is harder to obtain air photographs today than 60 years ago and no active aerial reconnaissance is carried out.

An important exception is Jordan. Twenty years ago a complete duplicate set of a 1953 vertical aerial survey of western Jordan was provided to David Kennedy, purchased in part with the assistance of grants from the British Academy and the Society of Antiquaries. Initially attracted to the region to study the Roman army in the East, his research interests expanded, not least because of the potential for aerial survey in Jordan. This led to the creation of an archive of aerial photographs for the Middle East under the patronage of His Royal Highness Prince Al-Hassan of the Hashemite Kingdom of Jordan. Subsequently, a grant from the Australian Research Council allowed the interpretation of this material and some 25,000 'sites' were identified and recorded on transparent maps of Jordan (at 1:25,000 scale).

In 1997, after repeated requests over a number of years, a flight in a military helicopter was provided for David Kennedy through the generosity of Brigadier General Prince Feisal, Deputy Commander of the Royal Jordanian Air Force (RJAF). More soon followed.

In 1998 a series of ten flights in military helicopters of the RJAF was carried out by Professor Kennedy and Dr Bewley. Flights took them into every part of the country, and almost 200 sites of every period and type were photographed. Over 4000 photographs were taken. In 1999 a further four flights were provided, which focused mainly on north-western Jordan. In 2000 no military helicopters were available but two flights were made in one of the few private (fixed-wing) aircraft in Jordan. The first was in the north-west again but the second ranged as far south as Petra. All of these photographs have been catalogued and copies of the catalogues have been placed on a web site at [www.arts.uwa.edu.au/classics/archeology/apamea/](http://www.arts.uwa.edu.au/classics/archeology/apamea/) Photographs in the collection are available to



Figure 1. Sir Aurel Stein FBA with RAF crew, and in flying gear.

interested users. Duplicate colour prints have been placed in the Library of the Council for British Research in the Levant (CBRL) in Amman and in the Registry of the Department of Antiquities of Jordan in Amman.

The initial objective was simply to establish that aerial archaeology was possible in Jordan and that it could be routine. Beyond that, the surveys have been designed to achieve several research objectives. First, methodology had to be explored. Not since Poidebard and Stein had there been a systematic programme of flying, and the techniques involved in using a helicopter were novel. Flying over each of the main geographical and environmental zones of Jordan – mountain,

Figure 2. The authors (Bewley on the left and Kennedy second from right) and Royal Jordanian Air Force crew with their Huey helicopter – an almost perfect platform for aerial survey in Jordan. © APAMEA



Figure 3. Khirbet Ain, Jordan.

This (probably) Roman fort was discovered in 1999 as part of the project in Jordan sponsored by the Academy. Subsequent field visits and examination of the surface pottery suggests a second to fourth century AD date, which is entirely in the expected date range for Rome's Eastern frontier. © APAMEA



fertile plateau, pre-desert and basalt and chert desert – allowed us to explore the techniques necessary for locating known sites and recording them from the air. In 1999 and 2000, flying focused more deliberately on the north-west, to record known sites and to search for new ones. Several important new sites were recorded (e.g. Figure 3) and we can expect to discover many more as well as to shed new light on those already known on the ground.

Second, the archaeology of Jordan is popularly equated with a handful of high-profile sites – Petra, Jerash and Kerak in particular. The hundreds of other sites, well-preserved and often immensely important, are little-known and could be promoted much more effectively. The selection of sites for photography in 1998, in particular, was in part designed to gather the material for a book, *Ancient Jordan From The Air*, now in progress.

A third strand of our work to emerge very forcefully is that of salvaging information and monitoring sites and landscapes under threat. Jordan's population is growing fast (a combination of immigration and a high birth rate) and this has an archaeologically damaging impact on the landscape. The great majority of Jordan's ancient sites remain unrecorded and unprotected, and are daily eroded by development projects of every kind. It has been equally frightening to realise the

extent to which major sites are threatened or even being destroyed. Jerash is protected within its walled area but the extensive and important cemeteries are being lost and even the Bronze Age and Iron Age predecessor on Tell Jerash has begun to disappear under the housing of modern Jerash (Figures 4 and 5). But less well-known sites are affected more directly. The superb Iron Age site of Tell al-Bira is being menaced by a major quarry on its fringe and the *qasr* just east of Ma'an which forms part of an important Classical and Early Islamic network of settlement has been almost obliterated. This happened after we had taken a photograph in 1998, and before a second in 2000.

Finally, despite the necessity to talk in terms of 'sites', the aerial view is allowing us to look at ancient landscapes and the articulation of sites within the landscape. Apart from continuing research into the Roman occupation of the region there are two obvious areas ripe for further aerial survey. The basalt desert of the north-east has a dense concentration of sites, with a huge array of 'kites', wheel-houses and other structures, and water-harvesting mechanisms; it is under great threat; and it is a poorly studied area. The next is the highly urbanised fertile land of the north-west which not only has a striking hierarchy of settlement site types but also a network of roads and tracks, terraces and field boundaries and great fields of prehistoric dolmens.

The authors wish to express their gratitude to all the funding bodies, and also to the Royal family of the Hashemite Kingdom of Jordan, especially Prince Al-Hassan and Brigadier Prince Feisal, for their support. Also to all those who have helped in the UK, Australia and Jordan, in particular the pilots and commanders of the Royal Jordanian Air Force, helicopter wing, the Air Attaches of the RAF and the staff of the Council for British Research in the Levant.

A desideratum has been to publish our findings for scholars, for the growing numbers of tourists and for Jordanians who are commonly more pre-occupied by the economic demands of the moment, at the expense of a cultural and economic asset of less obvious future benefit. The authors see an educational outcome as important, and programmes are being initiated to encourage Jordanian students and professionals to engage with this research. Since beginning this work, over 25 short articles and reports have appeared in works of scholarship, others in magazines of a wider international and local popular appeal, and the book on *Ancient Jordan From The Air* is scheduled for completion in 2002.

In the Middle East the future is often uncertain. Plans have been made and support granted for a further season of flying in 2001 and the intention is to seek such approval annually for a long-term programme. It is unlikely the RJAF can or will underwrite this work for much longer, but there are opportunities now for using a private aircraft that did not exist even as recently as 1998.

The objectives in 2001 and beyond are: the continuation of the programme of photographing known sites throughout the country; a new vertical aerial survey of at least the north-west of Jordan which seems most at threat, and a survey using LIDAR (which uses laser beams to record the landscape below) to record the surface profile



of this same region; further experimentation with methodology through flying in different seasons and at different times; developing a list of sites and areas to be monitored because of development threats; and a programme focused on the north-west of Jordan which would be integrated into a major project of ground survey and excavation.



Figures 4 above and 5 left Jerash, Roman city. These two images were taken 70 years apart (Figure 4 in 1928 and Figure 5 in 2000) and they show the extent of this very well preserved Roman (Decapolis) city. The huge encroachment from modern, mainly 20th-century development, is also clearly evident. Until the arrival of a Circassian settlement in the late 19th century, the city had been abandoned for at least a thousand years. © APAMEA

## Aerial Survey for Archaeology: report and conference

At a conference held at the Academy in May 2001, the Academy launched its report on aerial archaeology. **Dr Robert Bewley**, convener of the working party that drew up the report, describes below the significance of aerial survey for archaeology.

Aerial survey has been used for archaeological purposes for about a hundred years. It combines the techniques of aerial photography and reconnaissance with air photo interpretation, mapping and landscape archaeology. It is one of the most cost-effective techniques for discovering new sites as well monitoring the current condition of archaeological sites and architecturally important buildings and urban areas. Analyses of the results are transforming our knowledge and understanding of past human societies across Britain and Europe. All the major organisations responsible for the conservation and presentation of the historic environment in Britain use aerial survey as a routine method of investigation and as a source of information. There are national collections of historic photographs in England, Scotland and Wales.

The British Academy has funded research for many years in this field, and in 1999 it set up a working party on Aerial Survey for Archaeology, on the recommendation of the Academy's Archaeology Section (chaired by Professor Barry Cunliffe FBA). The working party included representatives of aerial survey practitioners in the UK, with myself as convener and Professor John Coles FBA as Chairman. Consultations took place with the Royal Commission on the Historic Monuments of England (merged with English Heritage in April 1999), the Royal Commission on the Ancient and Historical Monuments of Scotland, Royal Commission on the Ancient and Historical Monuments of Wales, the Environment and Heritage Service for Northern Ireland, and the Cambridge University Committee for Aerial Photography. Informal discussions were held with the Council for British Archaeology in the light of its proposed review of Aerial Archaeology in the UK.

The report of the working party was launched at a conference *Aerial Archaeology – Into the Future* held at the Academy in May 2001. The conference

attracted a capacity audience with participants from twelve European countries, including representatives from Bulgaria, Romania and Portugal where aerial archaeology is still in its infancy. The final discussion concluded that aerial survey for archaeology should continue its current approaches but also aim to expand its techniques and applicability to help all those organisations and individuals who wish to understand, conserve and protect the historic environment.

The Academy has continued to show its commitment to aerial archaeology in a number of ways. One of them has been its contribution to the European Union-funded project *Conservation through Aerial Archaeology*. As part of this project, twenty-two Italian student and professional archaeologists were trained in aerial reconnaissance, air photo interpretation and mapping, at a summer school held in May 2001. Many new sites were discovered, and the aims of the school, which was based in Tuscany, could not have been accomplished successfully without the collaboration of the University of Siena and the support from the British Academy.

The report is available on the British Academy's web site at [www.britac.ac.uk/reports/archaeology/](http://www.britac.ac.uk/reports/archaeology/)

